"EEE Yönetmeliğine Uygundur"
"This EEE is compliant with RoHS"

DVM PLUS IV

RD✳✳✳HHXG Series

RD✳✳✳HRXG Series

Air Conditioner
installation manual

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safety information

SAFETY INFORMATION

Before installing an air conditioner, please read this manual thoroughly to ensure that you know how to safely and efficiently install a new appliance.

✳ DVM PLUS Ⅳ air conditioner uses R410A refrigerant.
- When using R410A, moisture or foreign substances may affect the capacity and reliability of the product. Safety precautions must be taken when installing the refrigerant pipe.
- The designed maximum pressure of the system is 4.1MPa. Select appropriate material and thickness according to the regulations.
- R410A is a quasi-azeotrope of two refrigerants. Make sure to charge with liquid phase when filling refrigerant. If you charge vapour refrigerant, it may affect the capacity and reliability of the product as a result of a change in the blend of the refrigerant.

✳ Connect the indoor units for R410A refrigerant. Check whether the indoor units can be connected with the product's catalogue. (When incorrect indoor units are connected, they cannot operate normally.)

SEVERE WARNING SIGNS

If you don't follow the safety precautions, there may be a risk of injury or death.

The installation must be done by the manufacturer or its service agent or a qualified person in order to avoid a hazard.
- Installation by an unqualified person may cause a water leakage, electric shock or fire and so on.

Install the outdoor unit correctly according to the installation manual.
- An incorrect installation may cause a water leakage, electric shock or fire and so on.

Manufacturer is not responsible for accidents due to incorrect installation.

When installing the unit in a small room, take measures in order to keep the refrigerant concentration from exceeding allowable safety limits in the event of a refrigerant leak.
- Excessive refrigerant concentration in a closed room can lead to oxygen deficiency.

Use certified parts in the market and supplied parts from the factory.
- If you don't use the certified parts and tools, it can cause trouble to the air conditioner and injury.

If any gas or impurities except R410A refrigerant come into the refrigerant pipe, serious problem may occur and it may cause injury.

Make sure that there is no leakage after installation.
- Toxic gas may generate when refrigerant gas contacts with fire.

Leak test must be done using Oxygen Free Nitrogen (OFN) gas.

Use the supplied accessories, specified components and tools for the installation.
- Do not use the pipe and the installation product used for the R22 refrigerant.
- Failure to use the specified components can cause the product fall, water leakage, electrical shock, and fire. (The pipe and flare components used for R22 refrigerant must not be used)

Install the outdoor unit on a hard and even place that can support its weight.
- If the place cannot support its weight, the outdoor unit may fall down and it may cause injury.

Check the following before installation and service work.
- Before welding, remove dangerous and inflammable things that may cause an explosion and fire around the work.
- Before welding, remove the refrigerant from inside the pipe or the product.
  - Leakage of the refrigerant in the pipe while welding could make the pressure of the refrigerant rise causing the pipe to burst. The explosion could cause severe injury to the installer.
- When welding, use the OFN gas to eliminate oxidation inside the pipe.

Fix the outdoor unit securely on foundation to resist strong wind or earthquake.

- If the outdoor unit is not properly fixed, it turns over and accidents may occur.

The electric work must be done by service agent or qualified persons according to national wiring regulations and use only rated cable.

- Use certified power cable in the market suggested here and do electric work according to installation manual otherwise, electric shock or fire may occur.

Make sure of a earthing.

- Do not connect the earth wire to the gas pipe, water pipe, lighting rod or telephone wire. If earthing is incomplete, electric shock or fire may occur.

Fix power cable on fixture of outdoor unit securely not to be pulled out by external force.

- If fixing is incomplete, it can cause trouble with a heat generation, electric shock or fire and so on.

Arrange the cables between the indoor and outdoor unit after connecting. Attach the cover securely so that the electrical component box cover does not get loosen.

- If the cover is attached incompletely, it can cause trouble with a heat generation, electric shock or fire of the terminal board.

Install MCCB and ELB according to installation manual.

- If you do not install the MCCB and ELB, electric shock or fire may occur.

The unit must be plugged into an independent circuit if applicable or connect the power cable to the auxiliary circuit breaker. An all pole disconnection from the power supply must be incorporated in the fixed wiring with a contact opening of >3mm.

When installing, you should turn off the power supply before you control or adjust power supply.

- Otherwise, this may result in electrical shock.

If the refrigerant gas leaks during the installation, you should ventilate the room.

- Contact of the refrigerant gas with flammable things can cause toxic gas.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

When the product operates in heat mode during winter time, it operates protection mode when the outdoor temperature drops below 0°C. Therefore, supply the power during winter time. If the power is not supplied, compressor protection mode will not operate and cause product malfunction.

Do not modify the product on your own.

- Potential risk of electric shock, fire, product failure or injury.

CAUTION SIGNS

If you don't follow the safety precautions, you may get the risk of injury or loss of property.

Do not connect the heater to the outdoor unit and do not install altered duct as you please.

- The capacity may reduce, electric shock or fire may occur.

Make sure that the condensed water dripping from the drain hose runs out properly and insulate the drain pipe so that frost does not generate.

- Household goods may get wet if the drain pipe is not properly installed.

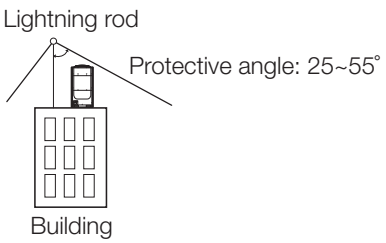
safety information

CAUTION SIGNS

Install the power cable and communication cable of the indoor and outdoor unit at least 1.5m away from the electric appliances and install it at least 2m away from the cable from the lightning rod.

- Noise may heard depending on the electric wave though the cables.
- Recommend that use a screened or shielded communication cable.

Install the outdoor unit within the angle of 25~55˚ depending on the building height as below table.

Building height	Protective angle	Remarks
Below 20m	55˚	
Below 40m	35˚	
Below 60m	25˚	

Install the indoor unit away from lighting apparatus using the ballast.

- If you use the wireless remote control, it may not operate normally.

Do not install the air conditioner in following places.

- The place where there is mineral oil or arsenic acid.
  Those parts may get damaged due to burned resin.
  The efficiency of the heat exchanger may reduce or the air conditioner may be out of order.
- The place where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet.
  The copper pipe or connection pipe may corrode and refrigerant may leak.
- The place where there is a machine that generates electromagnetic waves.
  The air conditioner may not operate normally due to control system.
- The place where there is a danger of existing combustible gas, thinner or gasoline is handled.
- The place where carbon fiber or flammable dust is.
- The place where like spa and shore.

Changes in DVM PLUS Ⅳ comparing with conventional models(DVM PLUS Ⅲ)

- Use R410A refrigerant.
- Check indoor units, MCU, distributor kits, etc which are connected with DVM PLUS Ⅳ are compatible with DVM PLUS Ⅳ or not.
- Version of AVX✶✶✶✶✶✶✶E and higher is available.
- Make sure the combination method of outdoor units is different from DVM PLUS Ⅲ.
- The length of maximum piping, level difference, the quantity of connectable indoor units, the installation at the outdoor joints and the outdoor unit combinations are different from the conventional models.
- Outdoor joint of gas side pipe should be installed horizontally due to the combination of variable units when the height of the main pipe is lower than the outlet of the pipe of the outdoor unit. The Installation of the liquid pipe and high pressure gas pipe are the same.
- If the pipe length between outdoor units becomes 2m or more, install vertical pipe trap to prevent oil stagnation in the pipes of the outdoor unit in the end of the module, in case of the outdoor unit in the end of the module stops operating while part loading operation in system. (Refer to page 26 for details.)

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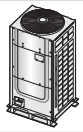
preparing the installation

SHAPE OF THE OUTDOOR UNIT

Classification	Small size	Large size
Shape		
Applicable model	RD080/100/120HHXG✳ RD080/100/120HRXG✳	RD140/160/180/200HHXG✳ RD140/160/180/200HRXG✳

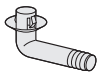
CAUTION

Disposal of packaging material

- Store the packaging material safely or dispose of them.
  - Sharp things such as nails and broken wooden packaging material can cause damage to humans.
  - Make sure that you keep the vinyl packaging material out of the reach of the children. Otherwise, placing vinyl material over the face can cause suffocation.

ACCESSORIES

- Keep supplied accessories until the installation is finished.
- Hand the installation manual over to the customer after finishing installation.
- The quantities are indicated in parentheses.

Model		Drain plug	Drain cap	Installation manual
				
RD080/100/120HHXG✳ RD080/100/120HRXG✳	EA	2	2	1
RD140/160/180/200HHXG✳ RD140/160/180/200HRXG✳	EA	3	3	1
Remarks		for connecting of drain pipe	for closing the drain hole	-

Optional accessories

- The following accessories are needed when installing the outdoor and indoor unit.

Type	Model	Total capacity
Y-joint	MXJ-YA1509✳	15.0kW below
	MXJ-YA2512✳	15.0~40.6kW
	MXJ-YA2812✳	40.6~46.4kW
	MXJ-YA2815✳	46.4~69.6kW
	MXJ-YA3119✳	69.6~98.6kW
	MXJ-YA3819✳	98.6~139.2kW
	MXJ-YA4422✳	139.2kW and over
Y-joint (Only for DVM PLUS Ⅳ HR module)	MXJ-YA1500✳	23.2kW and below
	MXJ-YA2500✳	23.2~69.6kW
	MXJ-YA3100✳	69.6~139.2kW
	MXJ-YA3800✳	139.2kW and over
Header joint	MXJ-HA2512✳	46.4kW and below (For 4 rooms)
	MXJ-HA3115✳	69.6kW (For 8 rooms)
	MXJ-HA3819✳	69.6kW and over (For 8 rooms)
Outdoor joint	MXJ-T3819✳	48HP and below
	MXJ-T4422✳	50HP and over
Outdoor joint (Only for DVM PLUS Ⅳ HR module)	MXJ-T3100✳	48HP and below
	MXJ-T3800✳	50HP and over

- When the indoor units without EEV such as wall mounted and ceiling type are installed, it is necessary to install distribution kits.
- It is necessary to install MCU when HR units are installed.
- Distribution kits and MCU should be purchased from the factory.

OUTDOOR UNIT COMBINATION

- Make sure an indoor unit is compatible with DVM PLUS IV
- Indoor units can be connected within following table range.
- If the total capacity of the connected indoor units exceeds the suggested guideline, the indoor unit cooling and heating capacity may decrease.
- Total capacity of the connected indoor units can be allowed to be from 50% to 130% over outdoor capacity. (Depending on operation condition, the ratio of total capacity of the connected indoor units over outdoor unit capacity should be considered carefully.)

  0.5x∑ (Outdoor unit capacity) ≤ Total capacity of the connected indoor units ≤ 1.3x∑ (Outdoor unit capacity)
- Up to 64 indoor units can be connected to an outdoor unit. The communication address of the indoor unit sets following the quantity of the maximum indoor unit connected.
- The minimum capacity of the indoor unit is 2.2kW.

CAUTION • Make sure to follow the table for combination installation of outdoor units.

Type	Outdoor unit capacity (HP)		8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
High efficiency	Outdoor unit combination	RD080HHXG∗ RD080HRXG∗	1					1		1						1													
		RD100HHXG∗ RD100HRXG∗		1				1	2							1	2	1											
		RD120HHXG∗ RD120HRXG∗			1						2	1	1					1	2	1	1								
		RD140HHXG∗ RD140HRXG∗				1				1		1		1						1		1							
		RD160HHXG∗ RD160HRXG∗					1						1	1	2	1	1	1	1	1	2	2	3						
	Nominal capacity	Cooling[kW]	22.4	28.0	33.6	39.2	44.8	50.4	56.0	61.6	67.2	72.8	78.4	84.0	89.6	95.2	100.8	106.4	112.0	117.6	123.2	128.8	134.4						
		Heating[kW]	25.2	31.5	37.8	44.1	50.4	56.7	63.0	69.3	75.6	81.9	88.2	94.5	100.8	107.1	113.4	119.7	126.0	132.3	138.6	144.9	151.2						
	Total capacity of the connected indoor units (cooling)	Minimum[kW]	11.2	14.0	16.8	19.6	22.4	25.2	28.0	30.8	33.6	36.4	39.2	42.0	44.8	47.6	50.4	53.2	56.0	58.8	61.6	64.4	67.2						
		Maximum[kW]	29.1	36.4	43.7	51.0	58.2	65.5	72.8	80.1	87.4	94.6	101.9	109.2	116.5	123.8	131.0	138.3	145.6	152.9	160.2	167.4	174.7						
	Maximum number of connectable indoor unit		13	17	20	23	26	30	33	36	40	43	46	50	53	56	60	63	64	64	64	64	64						
Compact	Outdoor unit combination	RD080HHXG∗ RD080HRXG∗	1																										
		RD100HHXG∗ RD100HRXG∗		1						1										1									
		RD120HHXG∗ RD120HRXG∗			1					1	2	1	1	1	1					1	2	1	1	1	1				
		RD140HHXG∗ RD140HRXG∗				1						1				1						1				1			
		RD160HHXG∗ RD160HRXG∗					1						1				1						1				1		
		RD180HHXG∗ RD180HRXG∗						1						1				1						1				1	
		RD200HHXG∗ RD200HRXG∗							1						1	1	1	1	2	1	1	1	1	1	2	2	2	2	3
	Nominal capacity	Cooling[kW]	22.4	28.0	33.6	39.2	44.8	50.4	56.0	61.6	67.2	72.8	78.4	84.0	89.6	95.2	100.8	106.4	112.0	117.6	123.2	128.8	134.4	140.0	145.6	151.2	156.8	162.4	168.0
		Heating[kW]	25.2	31.5	37.8	44.1	50.4	56.7	63.0	69.3	75.6	81.9	88.2	94.5	100.8	107.1	113.4	119.7	126.0	132.3	138.6	144.9	151.2	157.5	163.8	170.1	176.4	182.7	189.0
	Total capacity of the connected indoor units (cooling)	Minimum[kW]	11.2	14.0	16.8	19.6	22.4	25.2	28.0	30.8	33.6	36.4	39.2	42.0	44.8	47.6	50.4	53.2	56.0	58.8	61.6	64.4	67.2	70.0	72.8	75.6	78.4	81.2	84.0
		Maximum[kW]	29.1	36.4	43.7	51.0	58.2	65.5	72.8	80.1	87.4	94.6	101.9	109.2	116.5	123.8	131.0	138.3	145.6	152.9	160.2	167.4	174.7	182.0	189.3	196.6	203.8	211.1	218.4
	Maximum number of connectable indoor unit		13	17	20	23	26	30	33	36	40	43	46	50	53	56	60	63	64	64	64	64	64	64	64	64	64	64	64

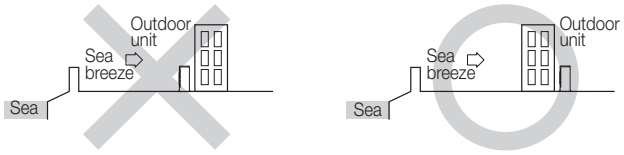
preparing the installation

SELECTING APPROPRIATE LOCATION FOR INSTALLATION

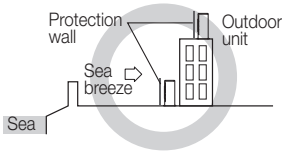
Decide the installation location based on the following condition and obtain the user's approval.

- Avoid a place that may disturb your neighbor. Noise may occur from the outdoor unit and the discharged air may run into the neighborhood. (Be careful of the operation time in a residential area)
- Install the outdoor unit on a hard and even area that can support its weight.
- Choose a flat place that rainwater does not settle or leak.
- Choose a place avoiding strong winds.
- Maintain sufficient space for repairs and service.
- Choose a place where you can easily connect the pipes and cables to the indoor unit.
- Make sure that the condensed water dripping from the drain hose runs out properly and safely.
- When installing the outdoor unit near seashore, make sure it is not directly exposed to sea breeze.
  If you can not find a adequate place without direct see breeze, protection wall should be constructed.

- Install the outdoor unit in a place (such as near buildings etc.) where it can be prevented from sea breeze which can damage the outdoor unit.



- If you cannot avoid installing the outdoor unit by the seashore, construct a protection wall around to block the sea breeze.



▶ Protection wall should be constructed with a solid material such as concrete to block the sea breeze and the height and the width of the wall should be 1.5 times larger than the size of the outdoor unit. Also, secure over 700mm between the protection wall and the outdoor unit for exhausted air to ventilate.

- Install the outdoor unit in a place where water can drain smoothly.

❊ If you cannot find a place satisfying above conditions, please contact manufacturer.
Make sure to clean the sea water and the dust on the outdoor unit heat exchanger and spread corrosion inhibitor on heat exchanger. (At least one time per one year.)

- Choose a place where there is no direct sunlight.
- Choose a place where it could not come into contact with snow and rain.
- Choose a place where flammable gas does not leak.
- Choose a place where the indoor and outdoor unit can be connected with a pipe.

⚠ CAUTION

- Install the indoor unit away from any interfering sources such as radio, computer, stereo equipment and also select the place where the electrical wiring work can be possible.
  - Especially keep the unit at least 3m away from the electrical equipment in an area electromagnetic waves generated and install the protection tube to protect the main power cable and communication cable.
  - Make sure that there is no equipment electromagnetic waves generate.
    If not, malfunction of the control system may occur due to the effect of the electromagnetic wave.
    (For example: The remote control sensor of the indoor unit may not be received well of electronic lighting style fluorescent lamps, such as fluorescent lamps are in the same space when using a remote control.)
- Make sure to install the outdoor unit in a safe place where snowfall will not be obstructed. The frame should be installed in a place where the air inlet and heat exchanger of the unit are not buried in the snow.
- A ventilation system may be required in the case the outdoor unit is installed in a closed space or room, even though R410a is not poisonous or flammable.
- Install the railing around the outdoor unit to prevent falling when the unit is installed at high place of roof on the building.
- Do not install the units in places where corrosive gases such as sulfur oxides, ammonia, and sulfurous gas are produced. e.g. Toilet outlet, ventilation opening, sewage works, dyeing complex, cattle shed, sulfuric hot spring, nuclear power plant, ship etc. When installing the units in those places, contact an installation specialty store as the copper pipe and brazing part will need additional corrosion proof or anti-rust additive to prevent corrosion.
- Make sure to install MCU when using HR products.
- When you select the location to install MCU, the location is far away from indoor rooms because the refrigerant running of MCU may create noise.
- According to the condition of power supply, electric noise or unstable voltage can occur malfunction of electric parts or control system.
  (At the ship or places using power supply from electric generator… etc)

SPACE REQUIREMENTS

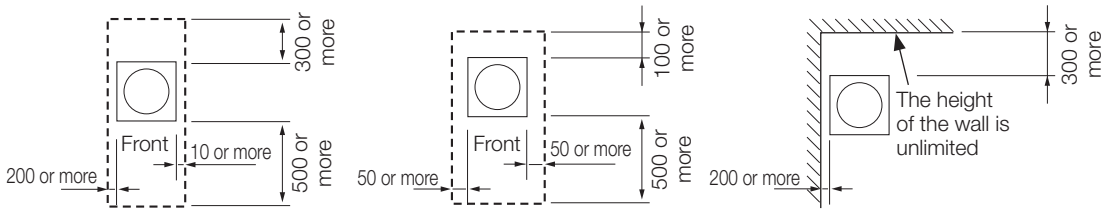
- The space suggested below is based on operating condition of outdoor temperature of 35°C. If operating condition of outdoor temperature is higher than 35°C, try to have more space.
- Make sure to clear a passage for a person and air flow.
- Observe the clearances and dimensions as seen below when installing the outdoor unit.
- If you install several outdoor units at the same place, observe the space for ventilation and free airflow.
- If the space for ventilation is insufficient, the air conditioner may not generate performance designed. Keep in mind that SAMSUNG logo is located on the front side of outdoor unit.

--------- Wall height restricted

Wall height unrestricted

When installing 1 outdoor unit

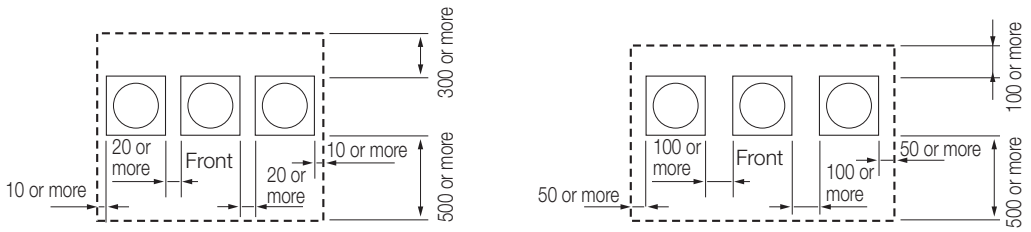
(Unit : mm)



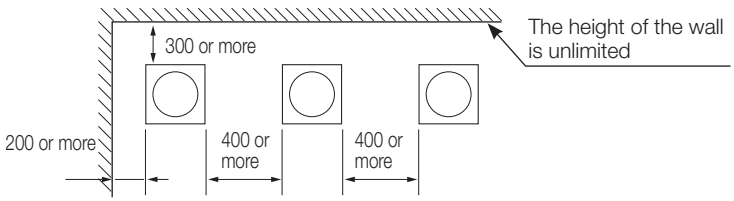
< Case 1 > < Case 2 > < Case 3 >

When installing more than 1 outdoor unit

(Unit : mm)



< Case 1 > < Case 2 >

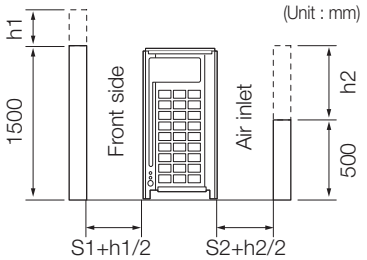


< Case 3 >

✻ In case of 'Case 1' and 'Case 2'

- The height of the wall should be 1500mm or less in the front side.
- The height of the wall should be 500mm or less in the air inlet side.
- The height of the wall is unlimited in the side.
- If the height of the wall exceeds the above value, the additional height (h1)/2, (h2)/2 should be added to the service space(S1), (S2) individually.

(Unit : mm)



Note

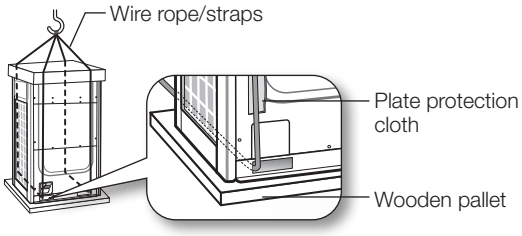
- The installation space mentioned above is minimum suggested clearance.
- To secure enough service space and performance of system, take account of more sufficient space.
- The required minimum space between outdoor units for service and performance of system is at least 100mm.

MOVING THE OUTDOOR UNIT

- Select the moving route in advance.
- Be sure that moving route is safe from weight of the outdoor unit.
- Do not slant the product more than 30˚ when carrying it.
  (Do not lay the product down sideways.)
- The surface of the heat exchanger is sharp. Be careful not to be get injury while moving and installing.

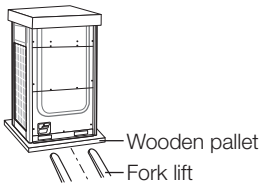
When moving with a crane or straps

- Fasten the wire rope as seen in the picture.
- To protect damage or scratches, insert a piece of cloth between the outdoor unit and the wire rope.



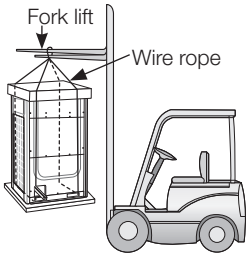
When moving with a fork lift

- Insert the fork into the wooden pallet at the bottom of the outdoor unit carefully.
- Be careful that the fork does not damage the outdoor unit.



When moving without using wooden pallet with a crane

- Connect the wire rope to the outdoor unit as you move it with a crane.
- Attach the wire rope to the fork lift to move the outdoor unit.



CAUTION

Safety information before the trial operation.

- When the outdoor temperature is low, turn on the main power supply four hours before operating
  - If you operate the machine immediately after turning on the main power supply, severe damage can be caused to parts inside the machine.
- Do not touch the refrigerant pipe during the operation or immediately after the operation.
  - While the outdoor unit is operating and immediately after the operation, the pipe is hot or cold according to the condition of the refrigerant that flows through the refrigerant pipe, compressor, and refrigerant cycle parts and if you touch the pipe during this time, it can cause burns or frostbite.
- Do not operate the machine without the product panel and protective net.
  - Otherwise, accidents can result from the contact with the components that are hot, spinning or under the high-voltage.
- Do not turn off the main power supply immediately after stopping the operation.
  - Before turning off the main power supply, you should wait at least 5minutes. Otherwise, water leaks and other problems can be caused.
- Execute the auto address setting while the power supply to all the indoor units and outdoor units is connected. Set the auto address after changing indoor unit PCB as well.

INSTALLING THE OUTDOOR UNIT

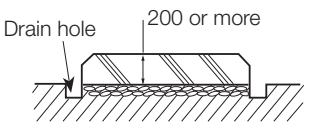
- Install the outdoor unit 200mm higher than the base surface and install the drain hole to connect the pipe to the drainage.
- The concrete foundation should be 1.5 times larger than bottom of the outdoor unit.
- Condensed water may be generated in heating operation. Pay attention to waterproof and drainage of the concrete foundation where the outdoor unit is installed.
  (An ice may form on the base surface in winter.)
- It is necessary to install wire mesh or steel bar when outdoor units are installed at soft foundation.
- When installing multiple outdoor units at the same place, install the H beam on the concrete foundation. (When installing a number of outdoor unit, you can install it on the concrete foundation.)
- Install the H beam(150mm x 150mm x t10 : basic specification) or vibration absorption frame to jut out from the concrete foundation.
- After installing the H beam or vibration absorption frame, apply corrosion protection.
- Install a square pad(t=20mm or more) or vibration absorption frame to prevent vibration of the outdoor unit delivering to the base surface when installing the concrete for the outdoor unit.
- Place the outdoor unit on the H beam or vibration absorption frame and fix it with the bolt, nut and washer. (The bearing force is more than 3.5kN)

CAUTION

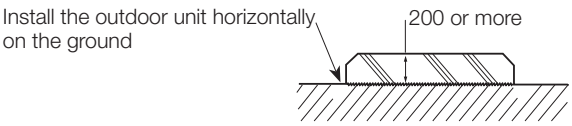
- Do not install the outdoor unit on a wood palette.
- Fix the outdoor unit securely to the base surface with anchor bolts.
- The manufacturer is not responsible for the damage occurred by not keeping standard of the installation.

Base mount construction

(Unit : mm)

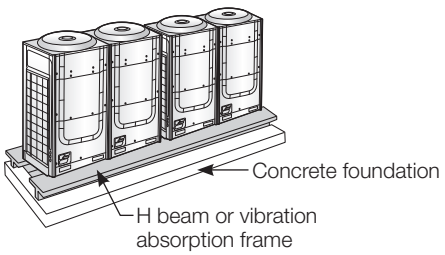


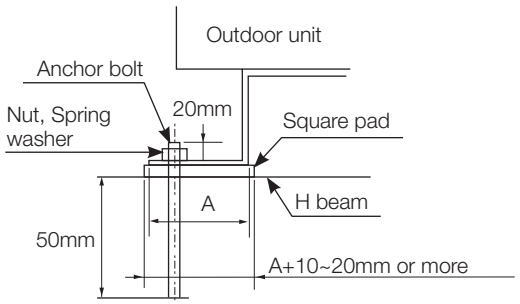
< When installing on the ground >

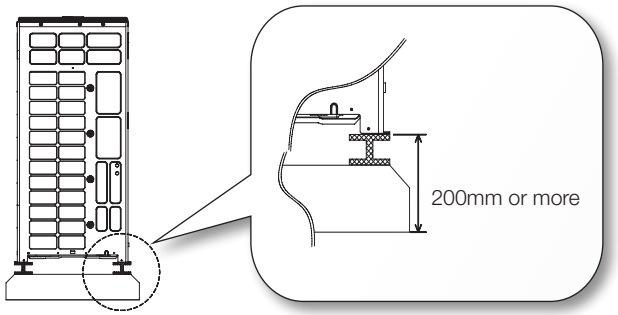


< When installing on the roof >

Outdoor unit installation



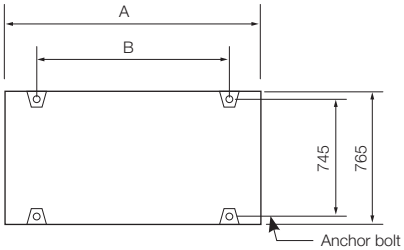




preparing the installation

Outdoor unit base mount and anchor bolt position

(Unit:mm)

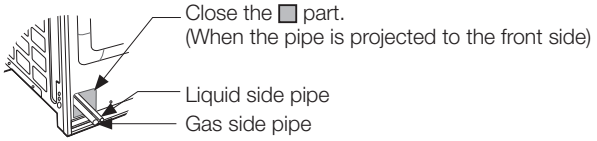


Classification	Small size	Large size
Applicable model	RD080/100/120HHXG✳ RD080/100/120HRXG✳	RD140/160/180/200HHXG✳ RD140/160/180/200HRXG✳
A	880	1,295
B	740	1,150

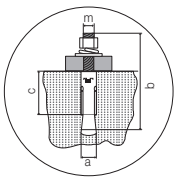
CAUTION

- **When tightening the anchor bolt**
  - Tighten the rubber washer to prevent the outdoor unit bolt connection part from corroding.

- **When connecting the pipes**
  - Check the strength of the roof to install the outdoor unit and make sure to have a waterproof floor of the roof.
  - Make sure that a proper drainage system has been put in place around the outdoor unit.
  - To protect the internal components of the outdoor unit, secure the pipework entrance to the unit.



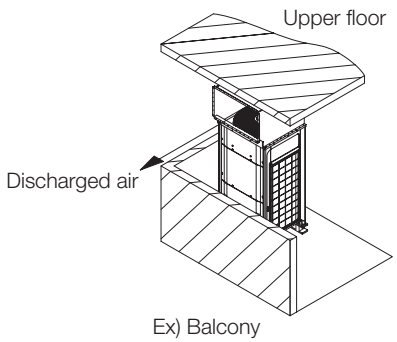
Anchor specifications

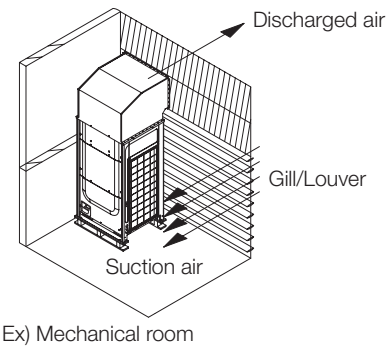


Size	Diameter of drill bit (a)	Anchor length (b)	Sleeve length (c)	Insert depth	Fastening torque
M10	14mm	75mm	40mm	50mm	30N·m

INSTALLING DUCT FOR HORIZONTAL EXHAUST DISCHARGE

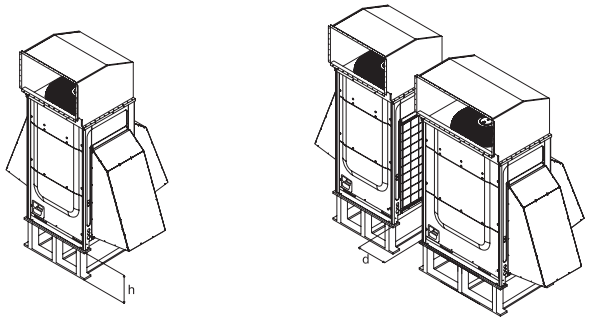
- It is necessary to install an air-discharge duct(field supply) to direct exhaust from the fan horizontally if it is difficult to provide a minimum space of 2m between the air-discharge duct outlet and a nearby obstacle as shown in the figure.





INSTALLING THE OUTDOOR UNIT IN HARSH ENVIRONMENTS

- In abnormally harsh environments such as cold and/or windy areas, sufficient countermeasures to guard against excessive wind and snow should be taken to ensure the unit's correct operation.
- Snow-proof duct(field supply) should be fitted to the unit and direct exposure to the wind should be avoided as much as possible.
- When the unit is expected to operate in cooling mode in condition under 10℃, in snowy areas, in environments subject to strong winds or rain, install air inlet and outlet ducting as shown below.

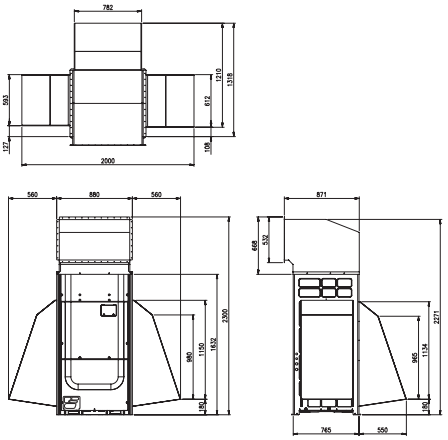


Note **The following problems may occur if proper countermeasures are not taken.**

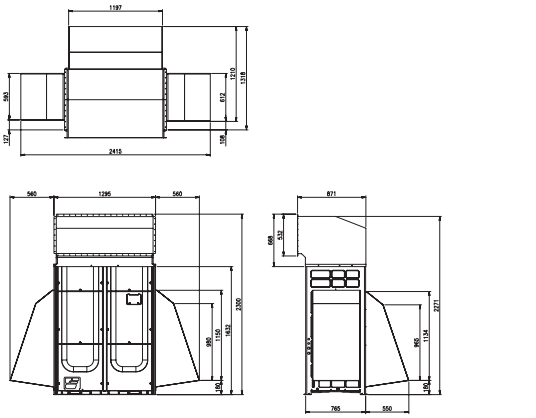
- The fan in the outdoor unit may stop running, causing the unit to be damaged.
- There may be no air flow.
- The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

When installing ducts

- Height of frame/foundation for snow damage prevention shall be twice as high as expected snowfall, width of frame/foundation shall not exceed that of the unit.
- The frame/foundation shall be made of angle steel, etc., and designed so that snow and wind slip through the structure. (If frame base is too wide, snow will be accumulated on it.)
- Install unit so that wind will not directly lash against openings of inlet and outlet ducts.



< RD080/100/120HHXG✳, RD080/100/120HRXG✳ >



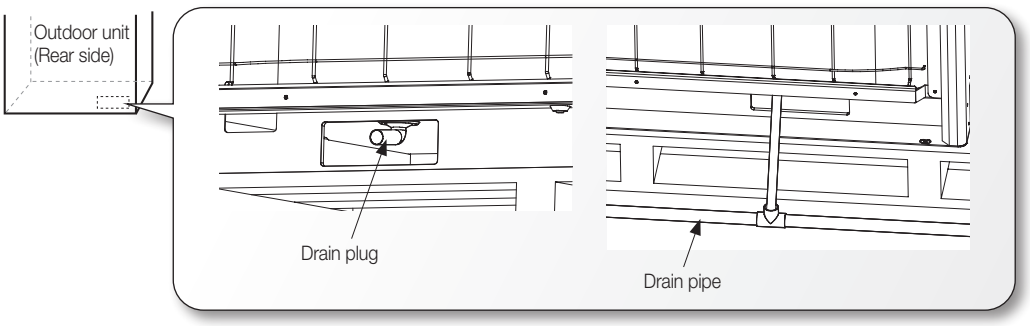
< RD140/160/180/200HHXG✳, RD140/160/180/200HRXG✳ >

CAUTION

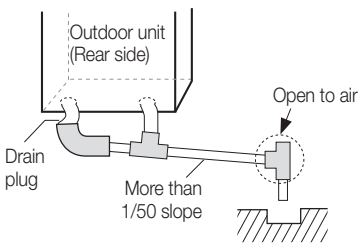
- The frame/foundation should be higher than expected snowfall.
- The foundation must be solid and the unit must be secured with anchor bolts.
- Be sure to install unit in a place strong enough to withstand its weight.
- When installing on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being overturned.
- Be sure to install unit in a place strong enough to withstand its weight.

INSTALLING THE DRAIN PIPE

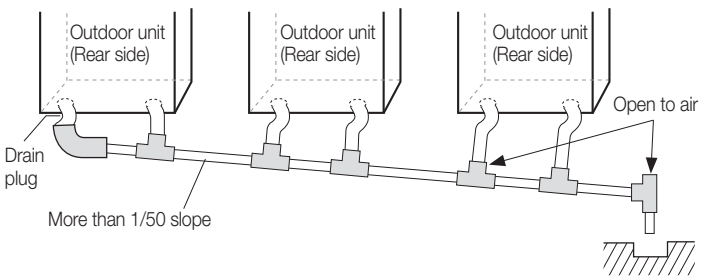
- Insert the provided drain plug at the 2 sides of the bottom of the unit and then connect the drain pipe.
- Install the drain pipe at the rear side of the unit to get a sufficient space for repairs and service.



When installing single outdoor unit



When installing multiple outdoor units



- Do not install a trap on the pipe.
  And, install the drain pipe horizontally with a slope of 1/50 or more.
- Insulate the drain pipe and drain plug with insulation over 10t.
- Install heating device to the drain pipe to prevent it from being frozen.
  Install the safety equipment for a heating appliance.

REFRIGERANT PIPING WORKS

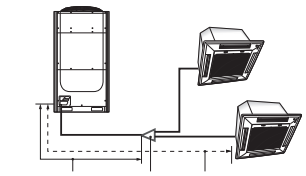
WARNING When installing, make sure there is no leakage. When recovering the refrigerant, ground the compressor first before removing the connection pipe.
If the refrigerant pipe is not properly connected and the compressor works with the service valve open, the pipe inhales the air and it makes the pressure inside of the refrigerant cycle abnormally high. It may cause explosion and injury.

- The piping length between the outdoor unit and the indoor unit may not exceed the allowable piping length.
- The pressure of the R410A is high.
  Use only certified refrigerant pipe and follow the installation method.
- Use clean refrigerant pipe which there is no harmful ion, oxide, dust, iron content or moisture inside pipe.
- Use tools and accessories fit on R410A.

Tool	Work	If compatible with conventional tool	
Pipe cutter	Refrigerant pipe work	Pipe cutting	Compatible
Flaring tool		Pipe flaring	
Refrigerant oil		Apply refrigerant oil on flared part	Ester series oil, alkali benzene oil or synthetic oil
Torque wrench		Connect flare joint with pipe	Compatible
Pipe bender		Pipe bending	
Nitrogen gas	Air tightening test	Inhibition of oxidization	
Brazing tool		Pipe brazing	
Gauge manifold	Air tightening test ~ additional refrigerant charging	Vacuuming, charging and checking operation	Exclusive
Refrigerant charging hose			
Vacuum pump	Vacuuming unit		Use one which has a check valve and 5 torr degree of vacuum.
Electronic scale			Compatible
Gas leak detector		Gas leak test	Exclusive
Flare joint	Use indoor unit's only		

Selecting the refrigerant pipe

- **When the equivalent pipe length from outdoor unit to the farthest indoor unit is over 90m, the main pipe (both liquid and gas pipe) has to be increased with 1 size like below table.**

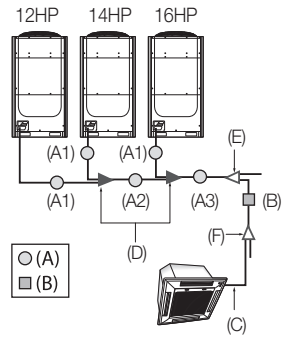


❊ Main pipe : from outdoor unit to the first branch joint.

The pipe length between outdoor and the farthest indoor unit	
Below 90m	**90m and over**
ø9.52	ø12.70
ø12.70	ø15.88
ø15.88	ø19.05
ø19.05	ø22.23
ø22.23	ø25.40
ø25.40	ø28.58
ø28.58	ø31.75
ø31.75	ø38.10
ø38.10	ø44.45
ø44.45	ø50.80

REFRIGERANT PIPING WORKS

Pipe selection for DVM PLUS IV



• Example) 42HP of compact combinations

HP	Mark	Pipe size (O. D.mm)	
		Liquid	Gas
12	(A1)	Ø12.70	Ø25.40
14	(A1)	Ø12.70	Ø25.40
16	(A1)	Ø12.70	Ø28.58
26	(A2)	Ø19.05	Ø31.75
42	(A3)	Ø19.05	Ø38.10

Outdoor unit connection pipe size : (A1), (A2), (A3)

A1 : Select the pipes according to the outdoor unit capacity with following table.
A2 : Select the pipes according to sum of outdoor unit capacities behind the outdoor joint with following table.
A3 : Select the main pipe of outdoor units with the following table.

Outdoor unit	Pipe size (O.D. mm), (A)		Oil balancing pipe size
	Liquid	Gas	
8HP	Ø9.52	Ø19.05	Ø6.35
10HP		Ø22.23	
12HP	Ø12.70	Ø25.40	
14HP			
16HP		Ø28.58	
18HP	Ø15.88		
20HP			
22HP			
24HP			
26~30HP	Ø19.05	Ø31.75	
32~34HP			
36~48HP		Ø38.10	
50~60HP	Ø22.23	Ø44.45	

*A1 : Pipes to the outdoor unit (Liquid, Gas)
*A2 : Pipes between outdoor joint kits (Liquid, Gas)
*A3 : Main pipes (Liquid, Gas)

Pipe size between branch joints : (B)

Select the pipe size according to the capacity sum of indoor units which are connected below this pipe.

Total indoor unit's capacity	Pipe size (O. D. mm)	
	Liquid	Gas
15.0kW and below	Ø9.52	Ø15.88
Over 15.0~23.2kW and below		Ø19.05
Over 23.2~29.0kW and below		Ø22.23
Over 29.0~40.6kW and below	Ø12.70	Ø25.40
Over 40.6~46.4kW and below		Ø28.58
Over 46.4~69.6kW and below	Ø15.88	
Over 69.6~98.6kW and below	Ø19.05	Ø31.75
Over 98.6~139.2kW and below		Ø38.10
Over 139.2kW	Ø22.23	Ø44.45

Pipe size between branch joints and indoor unit (C)

Select the pipe size according to the indoor unit's capacity.

Indoor unit's capacity	Pipe size (O. D. mm)	
	Liquid	Gas
2.0~5.6kW	Ø6.35	Ø12.70
7.2~14.5kW	Ø9.52	Ø15.88

Branch joint : (D), (E), (F)

■ Branch joint of outdoor unit's multi connection (D)

Outdoor multi connection branch joint (D)	Model	Capacity of outdoor
	MXJ-T3819✳	Below 48 HP
	MXJ-T4422✳	Above 50 HP

■ First branch joint (E)
Select branch joint according to the outdoor unit's capacity.

Y-joint (E)	Outdoor unit	Model
	8~14HP	MXJ-YA2512✳
	16HP	MXJ-YA2812✳
	18~24HP	MXJ-YA2815✳
	26~34HP	MXJ-YA3119✳
	36~48HP	MXJ-YA3819✳
	50~60HP	MXJ-YA4422✳

■ Branch joint (F)
Select the pipe size according to the capacity sum of indoor units which are connected below this pipe.

1) Y-joint

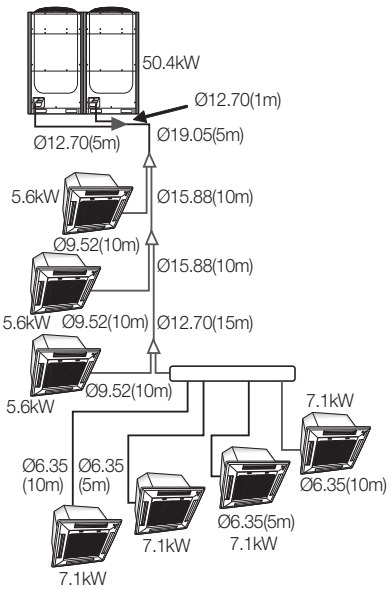
Y-joint (F)	Model	Total indoor unit's capacity
	MXJ-YA1509✳	15.0kW and below
	MXJ-YA2512✳	Over 15.0~40.6kW and below
	MXJ-YA2812✳	Over 40.6~46.4kW and below
	MXJ-YA2815✳	Over 46.4~69.6kW and below
	MXJ-YA3119✳	Over 69.6~98.6kW and below
	MXJ-YA3819✳	Over 98.6~139.2kW and below
	MXJ-YA4422✳	Over139.2kW

2) Header joint

Header joint (F)	Model	Total indoor unit's capacity	The connectable quantity of indoor units
	MXJ-HA2512✳	0~46.4kW and below	4
	MXJ-HA3115✳	Over 46.4kW ~ 69.6kW and below	8
	MXJ-HA3819✳	Over 69.6kW	8

Additional refrigerant charging

• Example) Additional refrigerant charging



■ Additional refrigerant has to be charged according to the length and size of liquid pipe.

Liquid pipe size (O.D. mm)	Additional refrigerant charging (kg/m)
ø6.35	0.02
ø9.52	0.06
ø12.70	0.125
ø15.88	0.18
ø19.05	0.27
ø22.23	0.35
ø25.40	0.53

■ The amount of the refrigerant that is already placed in

Classification	8HP	10HP	12HP	14HP	16HP	18HP	20HP
Standard	5.0	5.0	5.0	7.0	7.0	8.5	8.5

■ For the indoor unit connected to the distribution kit, the additional refrigerant charging is 0.01kg per meter regardless of the pipe size.

■ Charge the additional refrigerant according to the indoor unit capacity. The amount of the additional refrigerant charging for each indoor unit capacity = 0.046kg/kW

■ The method to calculate the total amount of the refrigerant.

- The amount of the refrigerant according to the pipe size and length (ⓐ)
- The amount of additional refrigerant charging for each indoor unit (ⓑ) = ∑ (Indoor unit capacity) x 0.046
- The total amount of the additional refrigerant charging = ⓐ+ⓑ

Additional refrigerant charging of distribution kit (kg/m)		Remarks
Regardless of the liquid pipe size, additional refrigerant charging is 0.01 kg per meter after distribution kit	0.01	For wall-mounted & ceiling indoor unit

■ Example of additional refrigerant charging. Pipe length is as below.

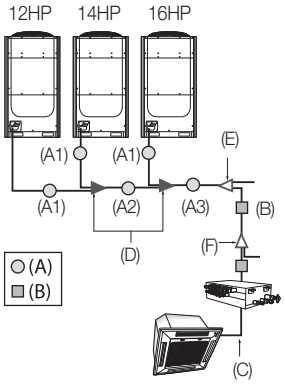
Liquid pipe size (O.D. mm)	Ø6.35	Ø9.52	Ø12.70	Ø15.88	Ø19.05
Length (m)	30	30	21	20	5

❊ ⓐ = 30x0.02 +30x0.06 + 21x0.125 + 20x0.18 + 5x0.27 = 9.975kg
ⓑ = (7.1x4 + 5.6x3)x0.046 = 2.079kg
The total amount of the additional refrigerant charging :
ⓐ+ⓑ = 9.975 + 2.079 = 12.054kg

❊ Total refrigerant amount of the system must be less than 100kg. If total refrigerant amount of system is over 100kg, the system has to be divided into smaller system, each containing less than 100kg.
ex) 20HP outdoor refrigerant is already charged 8.5kg, so the additional refrigerant must not be over 91.5kg.

REFRIGERANT PIPING WORKS

Pipe selection for DVM PLUS IV HR



• Example) 42HP of compact combinations

HP	Mark	Pipe size (O. D.mm)		
		Liquid	Low gas	High gas
12	(A1)	Ø12.70	Ø25.40	Ø22.23
14	(A1)	Ø12.70	Ø25.40	Ø22.23
16	(A1)	Ø12.70	Ø28.58	Ø22.23
26	(A2)	Ø19.05	Ø31.75	Ø28.58
42	(A3)	Ø19.05	Ø38.10	Ø31.75

Outdoor unit connection pipe size : (A1), (A2), (A3)

A1 : Select the pipes according to the outdoor unit capacity with following table.
A2 : Select the pipes according to sum of outdoor unit capacities behind the outdoor joint with following table.
A3 : Select the main pipe of outdoor units with the following table.

Outdoor unit	Pipe size (O.D. mm), (A)			Oil balancing pipe size
	Liquid	Gas	High gas	
8HP	Ø9.52	Ø19.05	Ø15.88	Ø6.35
10HP		Ø22.23	Ø19.05	
12HP	Ø12.70	Ø25.40	Ø22.23	
14HP				
16HP		Ø28.58		
18HP	Ø15.88		Ø25.40	
20HP				
22HP				
24HP				
26~30HP	Ø19.05	Ø31.75	Ø28.58	
32~34HP				
36~48HP		Ø38.10	Ø31.75	
50~60HP	Ø22.23	Ø44.45	Ø38.10	

*A1 : Pipes to the outdoor unit (Liquid, Gas, High pressure gas)
*A2 : Pipes between outdoor joint kits (Liquid, Gas, High pressure gas)
*A3 : Main pipes (Liquid, Gas, High pressure gas)

Pipe size between branch joints : (B)

Select the pipe size according to the capacity sum of indoor units which are connected below this pipe.

Total indoor unit's capacity	Pipe size (O.D. mm)		
	Liquid	Gas	High gas
15.0kW and below	Ø9.52	Ø15.88	Ø15.88
Over 15.0~23.2kW and below		Ø19.05	
Over 23.2~29.0kW and below		Ø22.23	Ø19.05
Over 29.0~40.6kW and below	Ø12.70	Ø25.40	Ø22.23
Over 40.6~46.4kW and below		Ø28.58	
Over 46.4~69.6kW and below	Ø15.88		Ø25.40
Over 69.6~98.6kW and below	Ø19.05	Ø31.75	Ø28.58
Over 98.6~139.2kW and below		Ø38.10	Ø31.75
Over 139.2kW	Ø22.23	Ø44.45	Ø38.10

Pipe size between branch joints and indoor unit : (C)

Select the pipe size according to the indoor unit's capacity.

Indoor unit's capacity	Pipe size (O. D. mm)	
	Liquid	Gas
2.2~5.6kW	Ø6.35	Ø12.70
7.1~14.0kW	Ø9.52	Ø15.88

Branch joint : (D), (E), (F)

■ Branch joint of outdoor unit's multi connection (D)

	Model	Capacity of outdoor
Liquid & Low gas pipe	MXJ-T3819✳	Below 48 HP
	MXJ-T4422✳	Above 50 HP
High gas pipe	MXJ-T3100✳	Below 48 HP
	MXJ-T3800✳	Above 50 HP

■ First branch joint (E)
Select branch joint according to outdoor unit's capacity.

	Outdoor unit	Model
Liquid & Low pressure gas Y-joint (E)	8~14HP	MXJ-YA2512✳
	16HP	MXJ-YA2812✳
	18~24HP	MXJ-YA2815✳
	26~34HP	MXJ-YA3119✳
	36~48HP	MXJ-YA3819✳
	50~60HP	MXJ-YA4422✳

	Outdoor unit	Model
High pressure gas Y-joint (E)	8HP	MXJ-YA1500✳
	10~24HP	MXJ-YA2500✳
	26~48HP	MXJ-YA3100✳
	50~60HP	MXJ-YA3800✳

■ Branch joint (F)

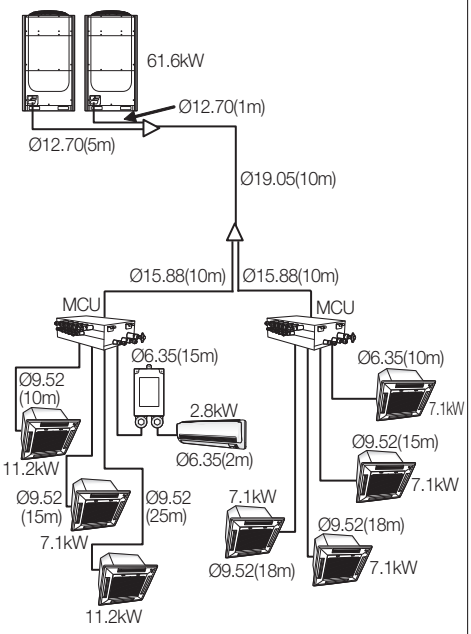
	Model	Total indoor unit's capacity
Liquid & low pressure gas Y-joint (F)	MXJ-YA1509✳	15.0kW and below
	MXJ-YA2512✳	Over 15.0~40.6kW and below
	MXJ-YA2812✳	Over 40.6~46.4kW and below
	MXJ-YA2815✳	Over 46.4~69.6kW and below
	MXJ-YA3119✳	Over 69.6~98.6kW and below
	MXJ-YA3819✳	Over 98.6~139.2kW and below
	MXJ-YA4422✳	Over 139.2kW

	Model	Total indoor unit's capacity
High pressure gas Y-joint (F)	MXJ-YA1500✳	23.2kW and below
	MXJ-YA2500✳	Over 23.2~69.6kW and below
	MXJ-YA3100✳	Over 69.6~139.2kW and below
	MXJ-YA3800✳	Over 139.2kW

CAUTION The sum of the total capacity of the indoor units connected to a MCU should not be over the max. 44.8kW.

Additional refrigerant charging

• Example) Additional refrigerant charging



■ Additional refrigerant is charged according to the length and size of liquid pipe.

Liquid pipe size (O.D. mm)	Additional refrigerant charging (kg/m)
Ø6.35	0.02
Ø9.52	0.06
Ø12.70	0.125
Ø15.88	0.18
Ø19.05	0.27
Ø22.23	0.35
Ø25.40	0.53

■ The amount of the refrigerant that is already placed in

Classification	8HP	10HP	12HP	14HP	16HP	18HP	20HP
Standard	5.0	5.0	5.0	7.0	7.0	8.5	8.5

Additional refrigerant charging of MCU kit	(kg/unit)
Additional refrigerant charging of MCU is 0.5kg for every MCU kit	0.5

Additional refrigerant charging of distribution kit (kg/m)		Remarks
Regardless of the liquid pipe size, additional refrigerant charging is 0.01kg per meter after distribution kit	0.01	For wall-mounted & ceiling indoor unit

■ Charge the additional refrigerant according to the indoor unit capacity. The amount of the additional refrigerant charging for each indoor unit capacity = 0.046kg/kW

■ The method to calculate the total amount of the refrigerant.

- The amount of the refrigerant according to the pipe size and length (ⓐ)
- The amount of additional refrigerant charging for each indoor unit (ⓑ) = ∑ (Indoor unit capacity) x 0.046
- The amount of other additional refrigerant charging (ⓒ) = ∑(The number of MCU Kit installed) x 0.5
- The total amount of the additional refrigerant charging = ⓐ+ⓑ+ⓒ

■ Example of additional refrigerant charging.
Pipe length is as below.

Liquid pipe size (O.D. mm)	Ø6.35	Ø9.52	Ø12.70	Ø15.88	Ø19.05
Length (m)	25	101	6	20	10

MCU	Pipe length after distribution kit (m)
2 Ea	2

❋ ⓐ = 25x0.02 +101x0.06 + 6x0.125 + 20x0.18 + 10x0.27 = 13.61kg
ⓑ = (11.2x2 + 7.1x5 + 2.8x1)x0.046 = 2.7922kg
ⓒ = 2x0.01 + 2x0.5 = 1.02
The total amount of the additional refrigerant charging :
ⓐ+ⓑ+ⓒ = 13.61 + 2.792 + 1.02 = 17.422kg

❋ Total refrigerant amount of the system must be less than 100kg.
If total refrigerant amount of system is over 100kg, the system has to be divided into smaller system, each containing less than 100kg.
ex) 20HP outdoor refrigerant is already charged 8.5kg, so the additional refrigerant must not be over 91.5kg.

REFRIGERANT PIPING WORKS

Temper grade and minimum thickness of the refrigerant pipe

Outer diameter [mm]	Minimum thickness [mm]	Temper grade
Ø6.35	0.7	C1220T-O
Ø9.52	0.7	
Ø12.70	0.8	
Ø15.88	1.0	
Ø19.05	0.9	C1220T-1/2H or C1220T-H
Ø22.23	0.9	
Ø25.40	1.0	
Ø28.58	1.1	
Ø31.75	1.1	
Ø38.10	1.35	
Ø44.45	1.6	
Ø50.80	2.0	

CAUTION Make sure to use C1220T-1/2H (Semi-hard) pipe for more than Ø19.05mm. In case of using C1220T-O (Soft) pipe for Ø19.05mm, pipe may be broken, which can result in an injury.

Keeping refrigerant pipe clean and dry

To prevent foreign materials or water from entering the pipe, it is important to keep the refrigerant pipe clean and dry and to seal it during installation.

Exposure place	Exposure time	Sealing type
Outside exposure	Longer than one month	Pipe pinch
	Shorter than one month	Taping
Inside exposure	-	Taping

Brazing the pipe

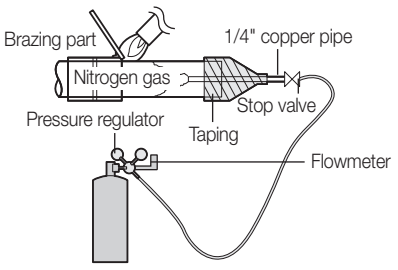
- Make sure that there is no moisture inside the pipe.
- Make sure that there are no foreign materials and impurities in the pipe.
- Make sure that there is no leak.
- Make sure to follow the instruction when brazing the pipe.

The use of Nitrogen gas

1. Use Nitrogen gas when brazing the pipes as shown in the picture.

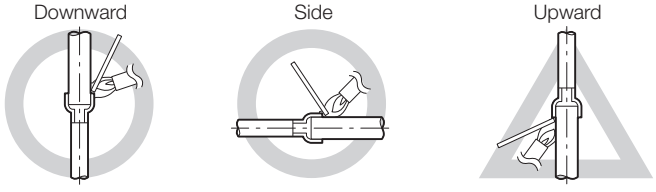
2. If you do not use Nitrogen gas when brazing the pipes, oxide may form inside the pipe. It can cause the damage of the compressor, valves.

3. Adjust the flow rate of the Nitrogen gas with a pressure regulator to maintain 0.05m^3/h or less.



Direction of the pipe when brazing

- Performing the brazing of the pipe should be headed downward or horizontally.



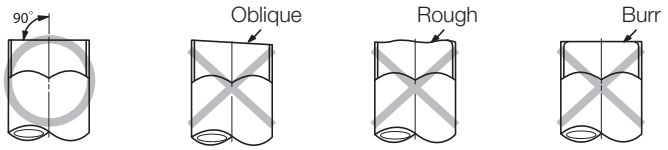
Note Avoid brazing the pipe upward.

Cutting or flaring the pipes

To prevent foreign materials or water from entering the pipe, it is important to keep the refrigerant pipe clean and dry and to seal it while installing.

1. Make sure that you prepared the required tools.
(pipe cutter, reamer, flaring tool and pipe holder)

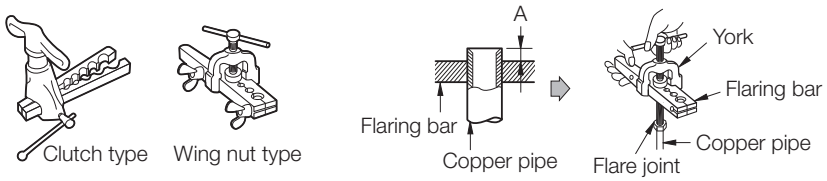
2. If you want to shorten the pipe, cut it using a pipe cutter ensuring that the cut edge remains at 90° with the side of the pipe. There are some examples of correctly and incorrectly cut edges below.

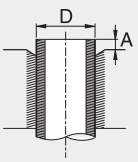


3. To prevent a gas leak, remove all burrs at the cut edge of the pipe using a reamer.

4. Carry out flaring work using flaring tool as shown below.

Flaring tool





Outer diameter (mm)	A(mm)		
	Flare tool for R410A clutch type	Conventional flare tool	
		Clutch type	Wing nut type
ø6.35	0~0.5	1.0~1.5	1.5~2.0
ø9.52	0~0.5	1.0~1.5	1.5~2.0
ø12.70	0~0.5	1.0~1.5	1.5~2.0
ø15.88	0~0.5	1.0~1.5	1.5~2.0

5. Check if you flared the pipe correctly. There are some examples of incorrectly flared pipes below.

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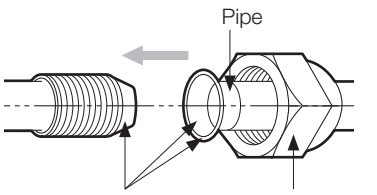
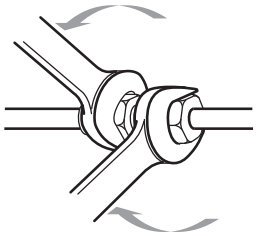
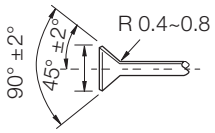
REFRIGERANT PIPING WORKS

Aligning the pipes

- Check that the flaring is properly made.
- Align the center of the piping and sufficiently tighten the flare nut with fingers. Finally, tighten the flare nut with torque wrench until the wrench clicks. When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.
- Make sure to use ester oil to coat the flare connection section.





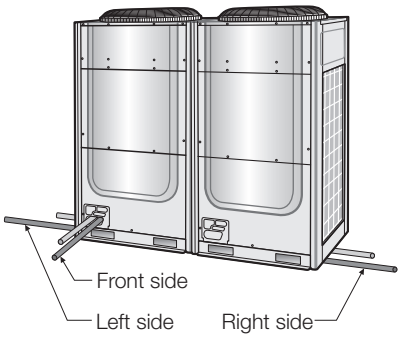
Outer diameter (mm)	Connection torque (kgf•cm)	Flare dimension (mm)	Flare shape (mm)
ø6.35	145~175	8.70~9.10	
ø9.52	333~407	12.80~13.20	
ø12.70	505~615	16.20~16.60	
ø15.88	630~769	19.30~19.70	

Caution for connecting the pipe

- Blowing Nitrogen gas should be done when brazing the pipe.
- Make sure to use the provided flare joint.
- Make sure that there are any cracks on the bent pipe.
- Do not fasten the flare joint with excessive strength.
- Use ester oil to coat the flare connection section to prevent refrigerant leak. R410A is a high pressure refrigerant therefore there is a risk of refrigerant leakage if the flare connection is not coated by ester oil.

Free piping & wiring directions

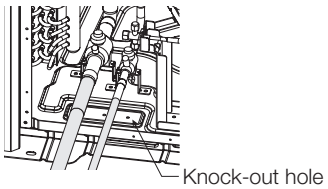
DVM PLUS IV is easy to install as its piping can be connected from front, right, left and bottom side. Wiring hole (Conduits) adds convenience as it allows power and communication lines to be connected in various ways and directions.

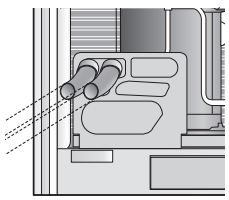


CAUTION

Caution for using knock-out hole

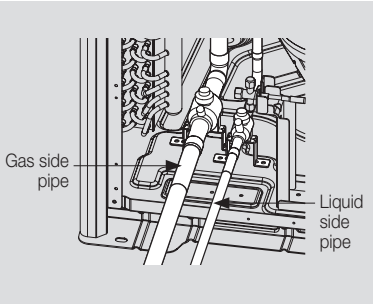
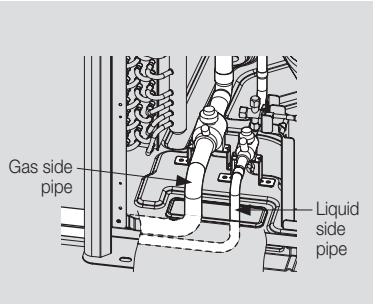
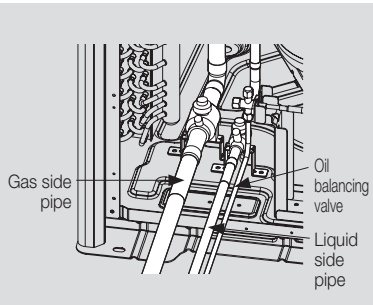
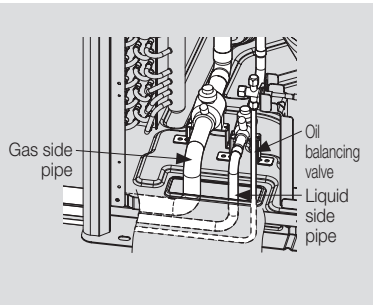
- Make sure not to damage the exterior of the outdoor unit.
- Remove all burrs at the edge of the knock-out hole and apply the paints it to prevent rust.
- Use a cable tube and bushing to prevent a cable from being damaged when passing through a knock-out hole.

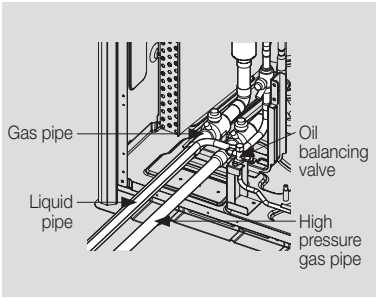
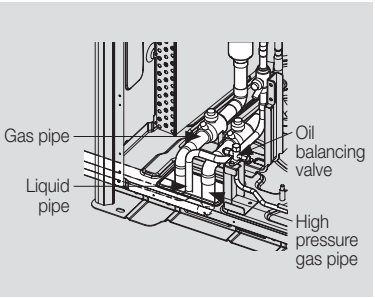
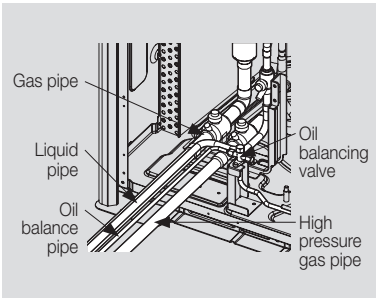
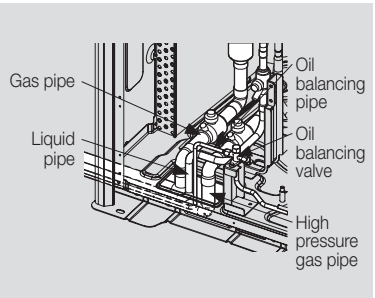




REFRIGERANT PIPING WORKS

Connecting the outdoor unit pipe

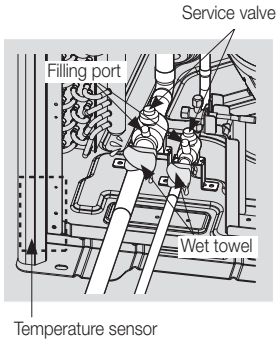
Heat Pump	Connection from front side	Connection from bottom at the left/right side
Working process	• First, remove the cover from unit. • Separate the knock-out hole to use. If the hole is open, small animals such as squirrels and rats may get into the unit through the hole and the unit may be damaged. • Fix the pipe cover of bottom side and fix the pipe cover of upper side thereafter.	• Separate the knock-out hole at the bottom side of the unit and install the pipe. • After installing and insulating the pipe, close up the remaining gap. If the gap is remain open, small animals such as rats and squirrels may get inside the unit and cause damage to the unit.
Single installation		
Combination installation		

Heat Recovery	Connection from front side	Connection from bottom at the left/right side
Single installation		
Combination installation		

CAUTION

Caution for connecting the pipe

- When connecting the pipe to the unit, the unit may get damaged by a welding fire and a flame. Use a flame proofing cloth to protect the unit from a welding fire or flame.
  Ambient air temperature sensor for detecting outside temperature is located on the left side of the welding part.
  Make sure not to damage the temperature sensor when welding it.
- The O-ring and Teflon packing inside service valve may get damaged by a welding fire. Wrap the bottom side of the service valve with a wet cloth and weld it as shown above. Make sure not to interrupt the welding with the drops of the wet cloth.
- The connecting pipes of liquid side and gas side should not contact each other.
  Vibration may cause a damage to the pipes.



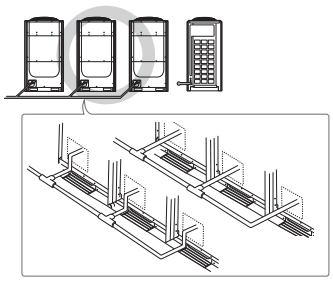
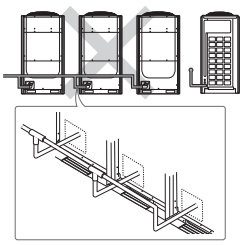
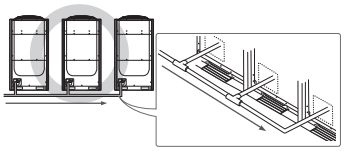
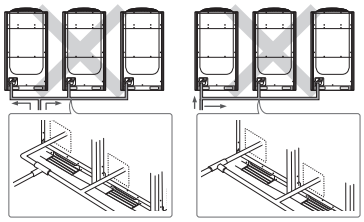
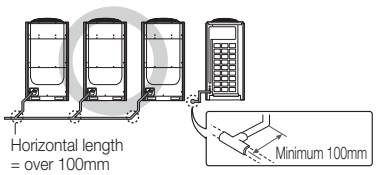
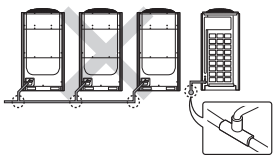
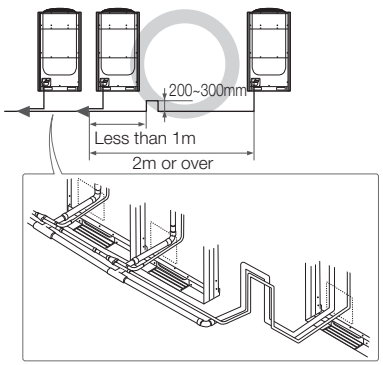
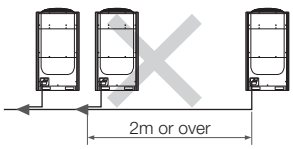
ENGLISH

REFRIGERANT PIPING WORKS

Piping works among outdoor units

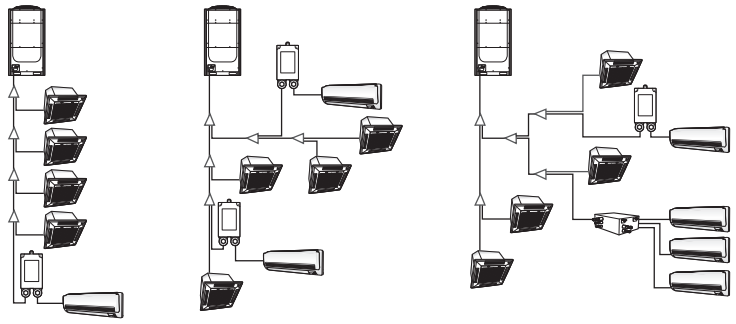
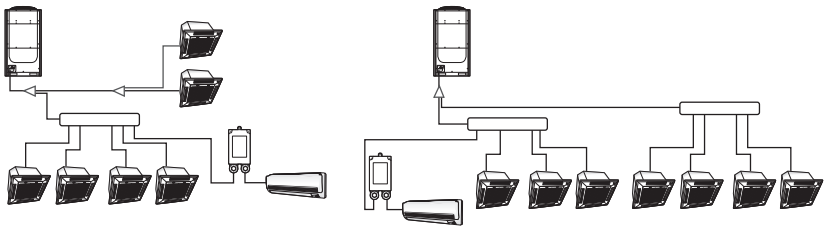
- The additional branch joints are needed for module installation of the outdoor units.
- When outdoor units are installed in module, there is no designation of outdoor unit's location according to capacity.
- The connected piping should be positioned at the same level with pipe cover hole or lower.

✳ Note the changes of DVM PLUS III, IV by comparing to DVM PLUS II

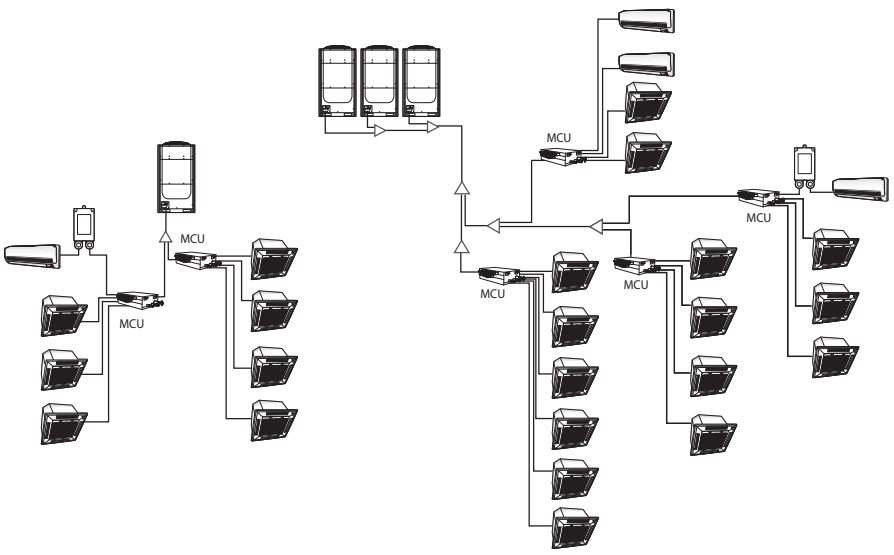
Cautions	Correct piping work	Wrong piping work
The refrigerant piping should be the same level or lower than connecting position of piping to outdoor units.		
Piping work should be run with side direction for better uniform distribution of refrigerant and oil like next diagram.		
Outdoor joint kits should be installed in a horizontal direction, even it is a low pressure pipe.		
When the piping length between outdoor and branch joints is 2m or more, a vertical trap has to be installed like right diagram.		

The examples of the refrigerant pipe installation

▶ **Heat Pump model**

	Example of piping layouts for **DVM PLUS** IV
Using Y- joint	
Using Header joint	 ❊ Do not use Y-joint between Header joint and indoor units.

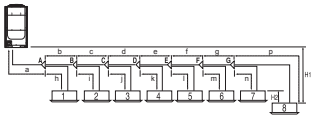
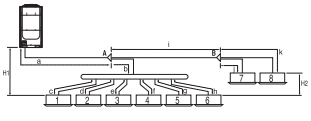
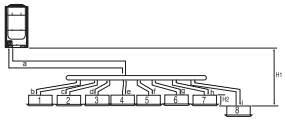
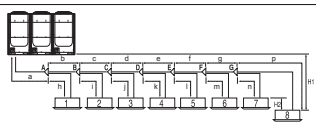
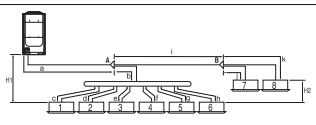
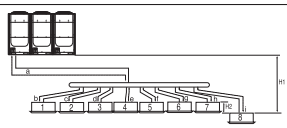
▶ **Heat Recovery model**

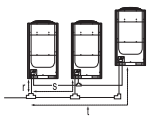
	Example of piping layouts
Using Y- joint	

REFRIGERANT PIPING WORKS

Piping examples

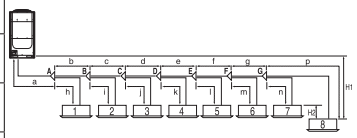
▶ **Heat Pump model**

	Branch with Y-joint	Branch with Y and Header joint	Branch with Header joint
One outdoor unit installed			
Multiple outdoor units installed			

Items				Examples		Remarks
Max. piping length	Outdoor ~ Indoor unit	Piping (Equivalent piping)	200m below (220m below)	Branch with Y-joint	a+b+c+d+e+f+g+p ≤ 200m (220m)	Equivalent pipe length Y-joint : 0.5m, Header : 1m
				Branch with Y-joint and Header joint	a+i+k ≤ 200m (220m) a+b+h ≤ 200m (220m)	
				Branch with header joint	a+i ≤ 200m (220m)	
		Total piping	1000m below	Branch with Y-joint	a+b+c+d+e+f+g+p+h+i+j+k+l+m+n ≤ 1000m	
				Branch with Y-joint and Header joint	a+b+c+d+e+f+g+p+h+i+j+k ≤ 1000m	
				Branch with Header joint	a+b+c+d+e+f+g+p+h+i ≤ 1000m	
	Outdoor ~ Outdoor unit	Piping	10m below	r ≤ 10, s ≤ 10, t ≤ 10m		
		Equivalent piping	13m below	r ≤ 13, s ≤ 13, t ≤ 13m		
Level difference	Outdoor ~ Indoor unit	Piping	110m / 40m*2)	H1 ≤ 110m/40m		
	Indoor ~ Indoor unit	Piping	15m below	H2 ≤ 15m		
	Outdoor ~ Outdoor unit	Piping	15m below	H3 ≤ 5m		
Allowable length after branch	The first branch ~ the farthest indoor unit	Piping	45m below	b+c+d+e+f+g+p ≤ 45m, i ≤ 45m		
			90m below *1)	It needs to satisfy required conditions		Only apply to DVM PLUS Ⅳ (DVM PLUS Ⅳ HR exclusion)

Distribution kit			Model	Remarks
Allowable	From distribution kit to indoor unit	3m	MEV-A13SA / MEV-A16SA (For 1 indoor unit)	For wall-mounted & ceiling indoor unit
	From distribution kit to indoor unit	20m	MXD-A13K116A / MXD-A13K200A / MXD-A16K200A / MXD-A22K200A (For 2 indoor units) MXD-A13K216A / MXD-A13K300A / MXD-A16K213A / MXD-A16K300A (For 3 indoor units)	

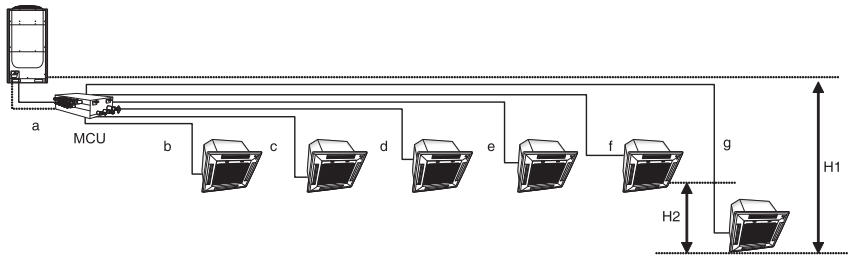
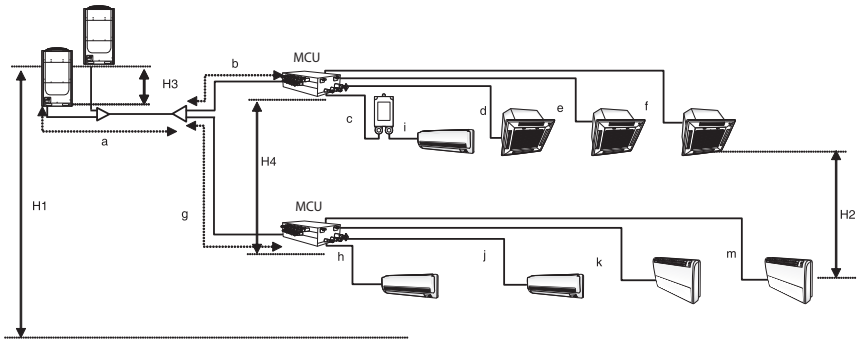
*1) Required condition

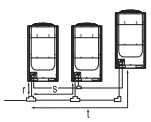
	Required condition	Example
The first branch joint ~ the farthest indoor unit	If the sum of pipe length (b+c+d+e+f+g+p) is over 45m,(but not exceed : 90m) Increase pipe size of b, c, d, e, f, g. (b, c, d, e, f, g : pipe 1 size up)	
Total pipe length size	If main pipe size is not increased, a+bx2+cx2+dx2+ex2+fx2+gx2+h+i+j+k+l+m+n+p ≤ 1000m	
	If main pipe size is increased, ax2+bx2+cx2+dx2+ex2+fx2+gx2+h+i+j+k+l+m+n+p ≤ 1000m	
Each Y-joint ~ each indoor	h, i, j,...p ≤ 45m	
Between indoor units	The difference between the distance of the outdoor unit to the farthest indoor unit and the distance of the outdoor unit to the nearest indoor unit ≤ 45m (a+b+c+d+e+f+g+p) - (a+h) ≤ 45m	

*2) As an outdoor unit is located in a lower position than indoor unit, level difference is 40m. If outdoor unit is located in a higher position than indoor unit, level difference is 110m or under. (If the level difference is higher than 50m, make a decision simulating by PDM kit installation Guide software whether the PDM kit should be installed or not.) *PDM kit: Pressure Drop Modulation kit

❉ The refrigerant amount of the system must be less than 100kg.

▶ Heat Recovery model

	Branch with Y-joint
Using MCU only	
Using Y- joint and MCU	

Items				Examples		Remarks
Max. piping length	Outdoor ~ Outdoor unit	Piping (Equivalent piping)	200m below (220m below)	Using MCU only	a+b+c+d+e+f+g ≤ 200m (220m)	Equivalent pipe length. Y joint : 0.5m, Header : 1m, MCU : 1m
				Using Y-joint and MCU	a+g+m ≤ 200m (220m)	
		Total piping	1000m below	Using MCU only	a+b+c+d+e+f+g ≤ 1000m	
				Using Y-joint and MCU	a+b+c+d+e+f+g+p+h+i+j+k+m ≤ 1000m	
		Piping	10m below	r ≤ 10, s ≤ 10, t ≤ 10m		
		Equivalent piping	13m below	r ≤ 13, s ≤ 13, t ≤ 13m		
Level difference	Outdoor ~ Indoor unit	Piping	110m / 40m*2)	H1 ≤ 110m/40m		
	Indoor ~ Indoor unit	Piping	15m below	H2 ≤ 15m		
	Outdoor ~ Outdoor unit	Piping	5m below	H3 ≤ 5m		
	MCU~MCU	Piping	15m below	H4 ≤ 15m		
Allowable length after branch	The first branch ~ the farthest Indoor unit	Piping	45m below	Using MCU only	45m	
				Using Y-joint and MCU	g+m ≤ 45m	
	MCU(Included EEV)	Piping	20m below	m ≤ 20m		

Distribution kit			Model	Remarks
Allowable	From distribution kit to indoor unit	3m	MEV-A13SA/MEV-A16SA (For 1 indoor unit)	For wall-mounted & ceiling Indoor unit

*2) As an outdoor unit is located in a lower position than indoor unit, level difference is 40m. If outdoor unit is located in a higher position than indoor unit, level difference is 110m or under. (If the level difference is higher than 50m, make a decision simulating by PDM kit installation Guide software whether the PDM kit should be installed or not.) *PDM kit: Pressure Drop Modulation kit

❉ The refrigerant amount of the system must be less than 100kg.

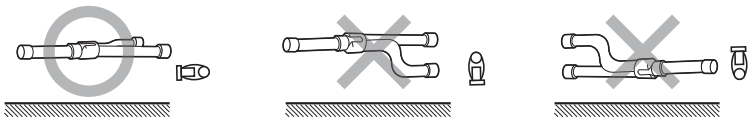
REFRIGERANT PIPING WORKS

Installing the branch joints

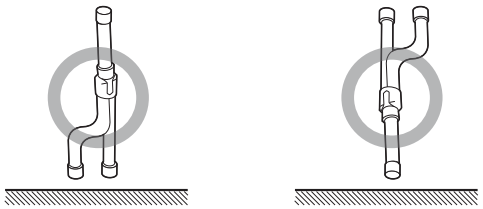
▶ **Y-joint**

- Install the Y-joint 'horizontally' or 'vertically'.

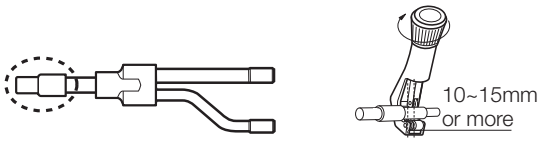
◗ Install horizontally



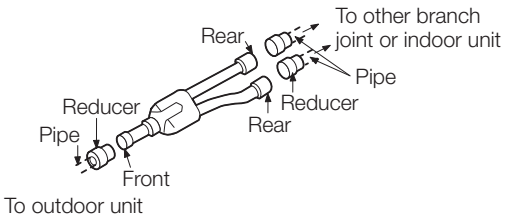
◗ Install vertically

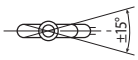


Note
- When using A~J type of Y-joint, connect the Y-joint to the pipe with provided reducer.
- When using K~Z type of Y-joint, connect the Y-joint to the pipe by cutting the inlet of the Y-joint or provided reducer properly.

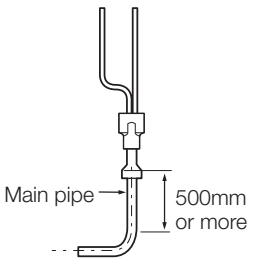


CAUTION
- Keep a minimum distance of 500mm or more before connecting a branch joint.



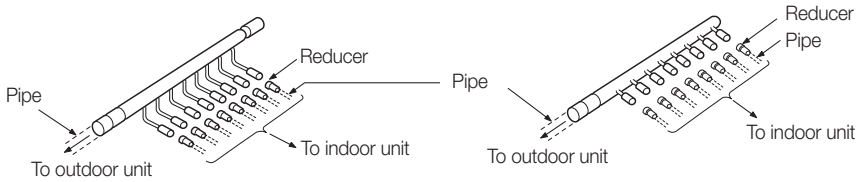


✳ Install the Y-joint within ±15° on the horizontal or on the vertical.



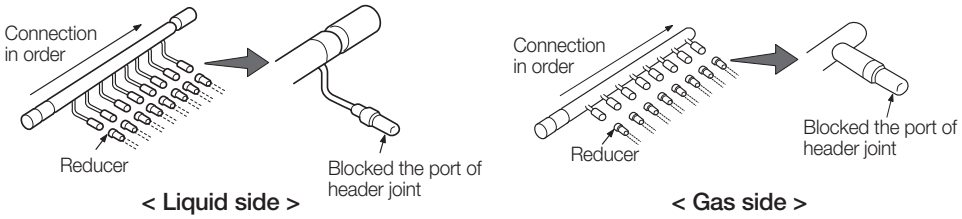
▶ **Header joint**

1. Select the reducer fitted on the diameter of the pipe.



< Liquid side > **< Gas side >**

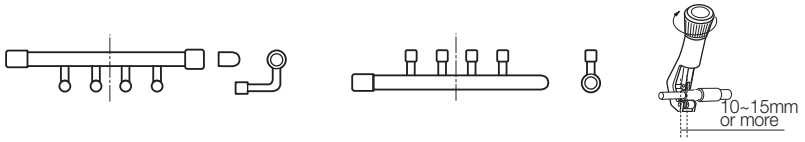
2. Braze the pipes ends with caps if the number of connected indoor unit is fewer than header joint ports.



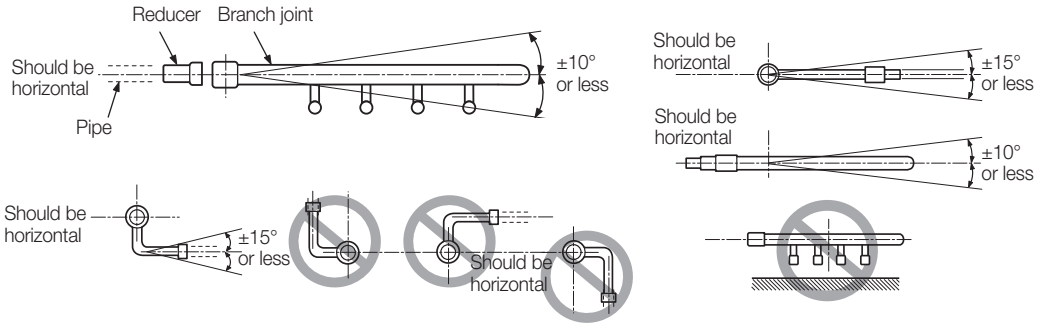
< Liquid side > **< Gas side >**

CAUTION

- When using A~J type of header joint, connect the header joint to the pipe with provided reducer.
- When using K~Z type of header joint, connect the header joint to the pipe by cutting the provided reducer properly.
- Connect the header joint in order respecting the number of the indoor unit.
- Connect the indoor unit as the highest capacity comes first.



3. Install the header joint horizontally.
- Install the header joint horizontally so that it is not facing down.



< Liquid side > **< Gas side >**

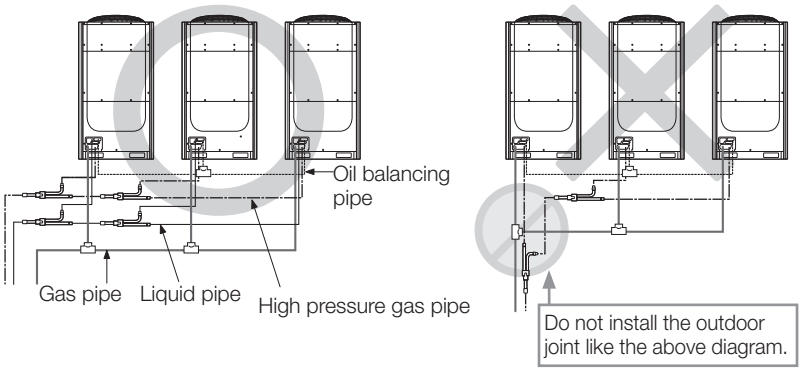
Note Incorrect installation of Y-joint and header joint cause poor oil and refrigerant distribution between indoor units.
It may decrease the system's performance or cause compressor failure.

REFRIGERANT PIPING WORKS

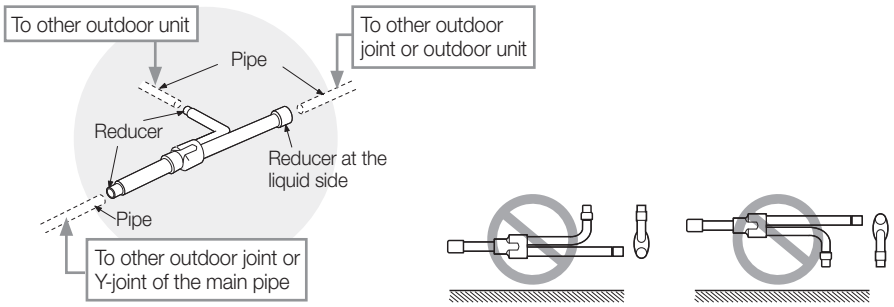
Installing the branch joints

▶ **Outdoor joint**

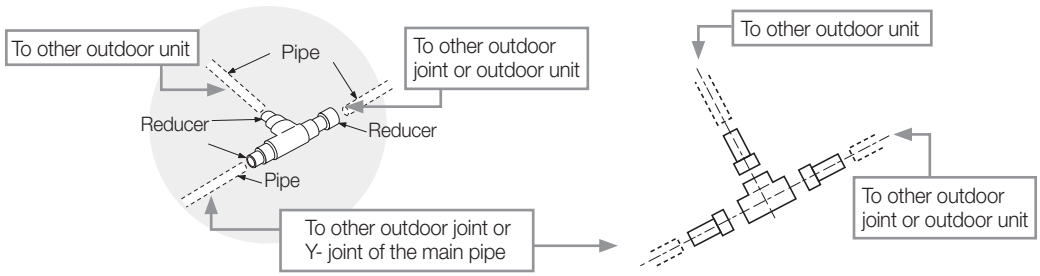
✳ Installation of outdoor joint



✳ Use the attached reducer properly according to the selected pipe size.



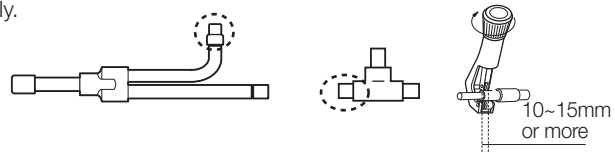
<Liquid pipe>

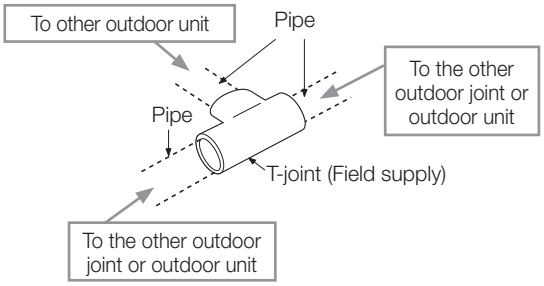


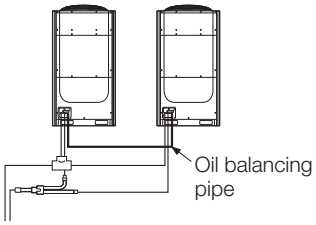
<Gas pipe, High pressure gas pipe>

Note

- When using A~J type of Outdoor joint, connect the Outdoor joint to the pipe with provided reducer.
- When using K~Z type of Outdoor joint, connect the Outdoor joint to the pipe by cutting provided reducer properly.





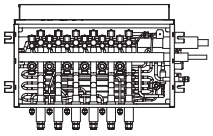
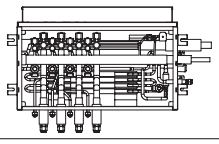
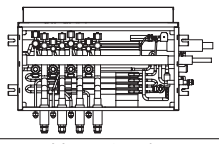


✳ Install the oil balancing pipe without T-joint when connecting 2 outdoor units.

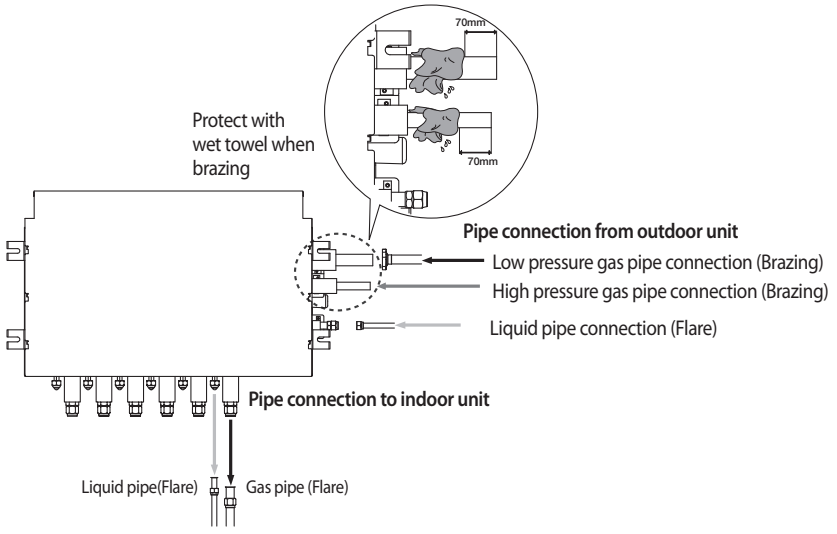
<T-joint for oil balancing> **<Oil balancing pipe>**

Note Keep in mind that T-joint must be installed horizontally to have best oil return to each compressor.

Installing MCU

Model	MCU-Y6NEE	MCU-Y4NEE	MCU-Y4NEE1
The exterior of MCU			
Number of connectable indoor units	Up to 6 units	Up to 4 units	Up to 2 units Only for large capacity duct (20.0kW↑)
The maximum capacity of the connectable indoor units	44.8kW	44.8kW	44.8kW
Internal EEV	Not included Cannot connect indoor unit without internal EEV.		

Connecting the pipe



CAUTION

- Use the provided installation pattern when installing the MCU.
- Use a welding curtain to prevent the unit to get damaged from a welding fire or flame when the welding for a high pressure gas pipe & low pressure gas pipe is made.
- Wrap the high pressure gas pipe & low pressure gas pipe with wet cloth when brazing it.

WIRING WORK

CAUTION

- Install a circuit breaker. For safety and maintenance, we strongly recommend that MCCB+ELB or ELCB have to be installed every outdoor unit.
  - ELCB : Earth Leakage Circuit Breaker
  - MCCB : Molded Case Circuit Breaker
  - ELB : Earth Leakage fuse Breaker
- Operate the unit after the refrigerant piping work must be done.
- Do not disassemble or alter the wiring of the unit during the electrical wiring work. If not, the unit may be damaged.

Specifications of the circuit breaker and power cable

▶ **Heat-Pump / Heat-Recovery model**

1. SINGLE

Capacity(HP)	Model	MCA	MFA
8	RD080HHXG✳ RD080HRXG✳	23.0	30
10	RD100HHXG✳ RD100HRXG✳	26.9	30
12	RD120HHXG✳ RD120HRXG✳	35.5	40
14	RD140HHXG✳ RD140HRXG✳	36.8	40
16	RD160HHXG✳ RD160HRXG✳	47.9	50
18	RD180HHXG✳ RD180HRXG✳	53.1	60
20	RD200HHXG✳ RD200HRXG✳	55.1	60

2. HIGH EFFICIENCY COMBINATION

Capacity (HP)	Combination					MCA	MFA
	RD080HHXG✳ RD080HRXG✳	RD100HHXG✳ RD100HRXG✳	RD120HHXG✳ RD120HRXG✳	RD140HHXG✳ RD140HRXG✳	RD160HHXG✳ RD160HRXG✳		
18	1	1				49.9	50
20		2				53.8	60
22	1			1		59.8	60
24			2			71.0	75
26			1	1		72.3	75
28			1		1	84.6	75
30				1	1	84.6	75
32					2	95.8	100
34	1	1			1	97.8	100
36		2				101.6	100
38		1	1		1	110.3	100
40			2		1	118.9	125
42			1	1	1	120.1	125
44			1		2	131.3	125
46				1	2	132.5	125
48					3	143.6	150

3. COMPACT COMBINATION

Capacity (HP)	Combination							MCA	MFA
	RD080HHXG✳ RD080HRXG✳	RD100HHXG✳ RD100HRXG✳	RD120HHXG✳ RD120HRXG✳	RD140HHXG✳ RD140HRXG✳	RD160HHXG✳ RD160HRXG✳	RD180HHXG✳ RD180HRXG✳	RD200HHXG✳ RD200HRXG✳		
22		1	1					62.4	75.0
24			2					71.0	75.0
26			1	1				72.3	75.0
28			1		1			83.4	75.0
30			1			1		88.6	100.0
32			1				1	90.6	100.0
34				1			1	91.9	100.0
36					1		1	103.0	100.0
38						1	1	108.3	100.0
40							2	110.3	100.0
42		1	1				1	117.5	125.0
44			2				1	126.1	125.0
46			1	1			1	127.4	125.0
48			1		1		1	138.5	125.0
50			1			1	1	143.8	150.0
52			1				2	145.8	150.0
54				1			2	147.0	150.0
56					1		2	158.1	150.0
58						1	2	163.4	150.0
60							3	165.4	150.0

Note

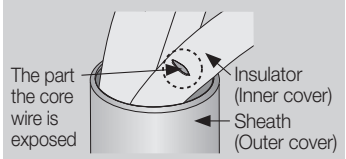
- Power supply cords of parts of appliances for outdoor use shall not be lighter polychloroprene sheathed flexible cord. (Code designation IEC : 60245 IEC66 / CENELEC : H07RN-F)
- Select power supply cord based on MCA.
- MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth leakage circuit breaker).
- MCA represents maximum input current.

✳ Abbreviations
- MCA : Min. Circuit Amps. (A)
- MFA : Max. Fuse Amps. (A)

CAUTION

Safety information for electrical work

- You should install the ELCB or MCCB + ELB
  - ELCB(Earth Leakage Circuit Breaker)
  - MCCB(Molded Case Circuit Breaker)
  - ELB(Earth Leakage fuse Breaker)
- Do not operate the outdoor unit before completing refrigerant pipe work.
- Do not disconnect or change the cable inside the product during the electrical work since it can cause damage to the product.
- The power supply cable specification is selected according to the condition of air culvert installation / ambient temperature 30°C/ single multi conductor cables. If the condition is different from those above consult the installation expert and reselect the power supply cable.
  - If the length of power supply cable is longer than 50m, reselect the power supply cable in light of voltage drop.
- Use incombustible material for the insulator (inner cover) and sheath (outer cover) for power supply cable.
- When removing the sheath of the cable, do not use the power supply cable which has scratches on the insulator and the core wire is exposed. When the core wire is exposed, it can cause fire.



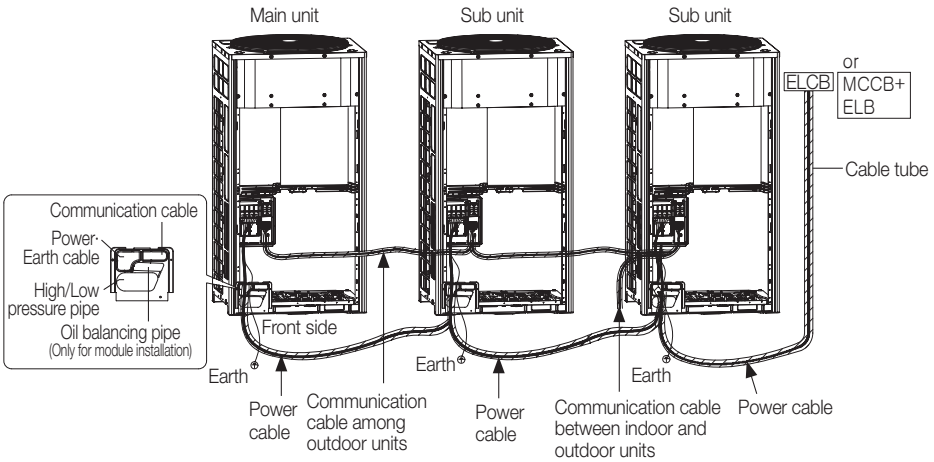
<The example of exposed core wire>

ENGLISH

WIRING WORK

Power supply and communication cable configuration

- Install the main power cable and grounding cable through the knock-out hole that is in the middle (or in the bottom) of the side of the unit and at the bottom of the front of the unit.
- Install the power and communication cable using the cable tube separately.
- Fix a cable tube using a CD connector(Wire conduit) and bushing at the knock-out hole of the outdoor unit.



Specifications of the cable tube

Name	Material	Description
CD tube	PVC	- When the unit is installed indoors - When the unit is not exposed outdoors because of concrete construction
Single power cable tube	Galvanized steel sheet	- When the unit is installed indoors - When the unit is exposed outdoors and then the protection for a power cable is needed
Single vinyl tube for a power cable	Galvanized steel sheet + Soft PVC compound	- When the unit is installed indoors - When the unit is exposed outdoors and then the protection for a power cable or waterproof function is needed

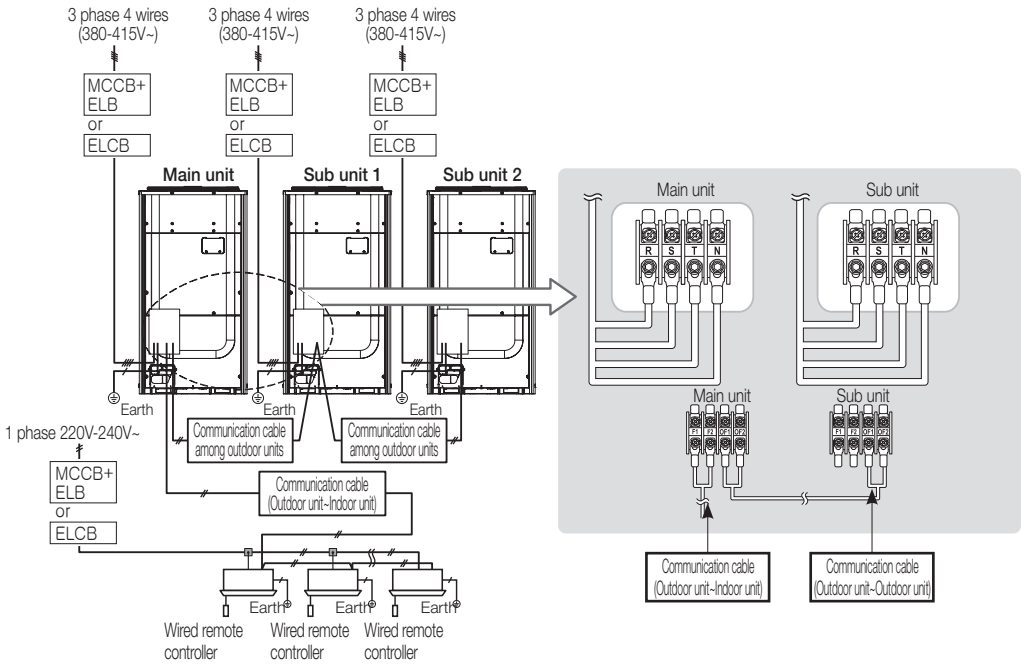
Caution for knock-out punching

- Make a knock-out hole by driving in a nail.
- After making a knock-out hole, apply rust resisting paint around the hole.
- Remove all burrs at the edge of the knock-out hole and secure the cable to the outdoor knock-out using lining and bushing with an electrical insulation such as rubber and so on.

Connect the power cable using the compressed ring terminal.

Power wiring diagram

▶ **External connection diagram of DVM PLUS Ⅳ**



- Connect the power cable of the outdoor unit after checking that R-S-T-N(3 phase 4 wire) is properly connected. Even if 380~415V power cable is connected to phase N, PCB and other components are protected by an electric protection system.
- The communication cable between indoor and outdoor units has no polarity.
- Arrange the cables using cable ties.

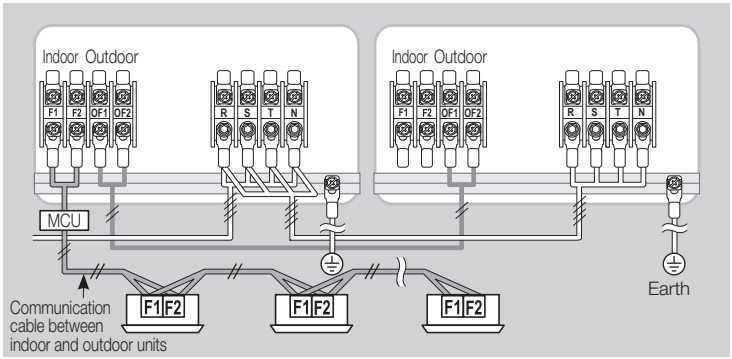
❊ When you use the 3phase-3wire power supply, contact the local Samsung staff to take extra steps.

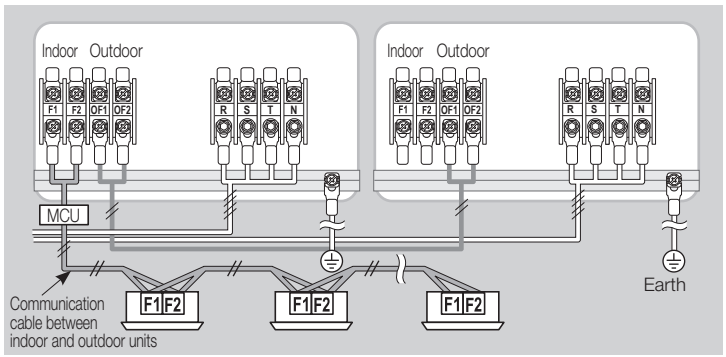
WIRING WORK

Power wiring diagram

▶ **External connection diagram of DVM PLUS Ⅳ HR**

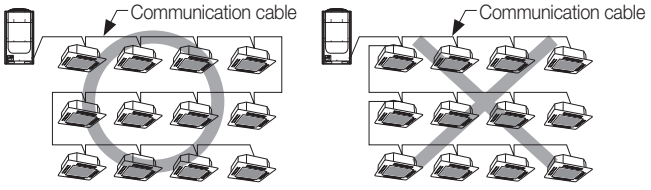
3 phase 4 wires





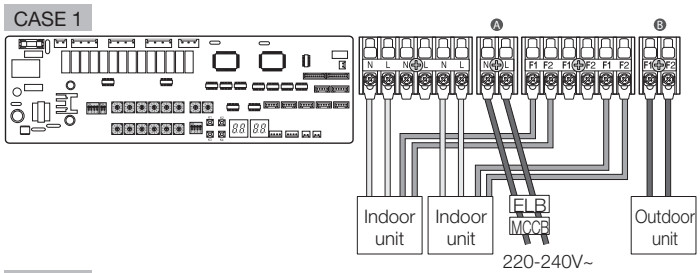
CAUTION

- Indoor power supply must be separated from outdoor power supply.
- Connect the communication cable among the outdoor units when combining the outdoor units.
- Connect the communication cable between indoor and outdoor units to the main outdoor unit.
- If the communication cable between indoor and outdoor units and the communication cable among outdoor units are crossed, communication is not available.
- The length of the cable among the outdoor units should be under 30m or less.
- Do not multiplex the communication cable to prevent communication error.
- Maximum wiring length between the outdoor unit and the farthest indoor unit is 1000 meters.

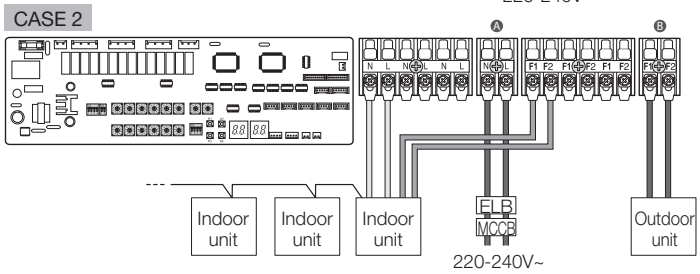


▶ **MCU**

CASE 1

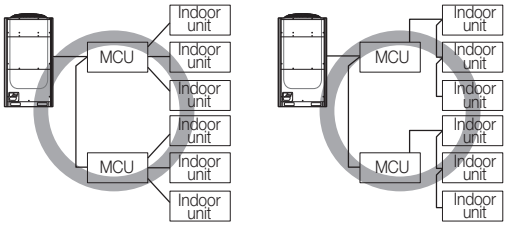


CASE 2



- Ⓐ Supply the 220-240V power to L, N of MCU separately from outdoor unit.
- Ⓑ Connect the communication cable from the outdoor unit to F1, F2 of MCU.

CAUTION Connect the power cable using the compressed ring terminal.

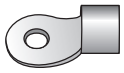


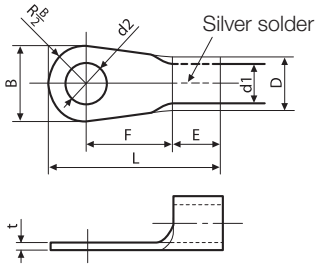
Note Communication cables are connected as shown above when installing MCU.

WIRING WORK

Selecting solderless ring terminal

- Select a solderless ring terminal of a connecting power cable based on a nominal dimensions for cable.
- Cover a solderless ring terminal and a connector part of the power cable and then connect it.

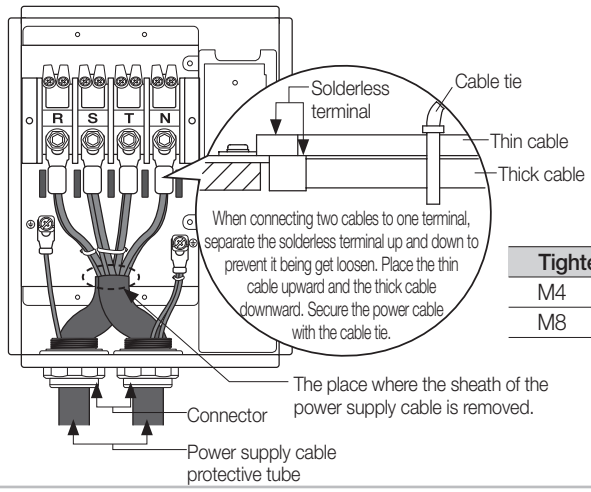




Nominal dimensions for cable (mm^2)	Nominal dimensions for screw (mm)	B		D		d1		E	F	L	d2		t
		Standard dimension (mm)	Allowance (mm)	Standard dimension (mm)	Allowance (mm)	Standard dimension (mm)	Allowance (mm)	Min.	Min.	Max.	Standard dimension (mm)	Allowance (mm)	Min.
4/6	4	9.5	±0.2	5.6	+0.3 -0.2	3.4	±0.2	6	5	20	4.3	+ 0.2 0	0.9
	8	15							9	28.5	8.4	+0.4 0	
10	8	15	±0.2	7.1	+0.3 -0.2	4.5	±0.2	7.9	9	30	8.4	+0.4 0	1.15
16	8	16	±0.2	9	+0.3 -0.2	5.8	±0.2	9.5	13	33	8.4	+0.4 0	1.45
25	8	12	±0.3	11.5	+0.5 -0.2	7.7	±0.2	11	15	34	8.4	+0.4 0	1.7
	8	16.5							13		8.4		
35	8	16	±0.3	13.3	+0.5 -0.2	9.4	±0.2	12.5	13	38	8.4	+0.4 0	1.8
	8	22							13	43	8.4		
50	8	22	±0.3	13.5	+0.5 -0.2	11.4	±0.3	17.5	14	50	8.4	+0.4 0	1.8
70	8	24	±0.4	17.5	+0.5 -0.4	13.3	±0.4	18.5	20	51	8.4	+0.4 0	2.0

Connecting the power terminal

- Connect the cables to the terminal board using the solderless ring terminal.
- Connect the certified and rated cables only.
- Connect using a driver which is able to apply the rated torque to the screws.
- If the terminal is loose, fire may occur caused by arc.
  If the terminal is connected too firmly, the terminal may be damaged.
- External force should not be applied to the terminal block and wires.
- The cable ties to fasten the wire should be an incombustible material, V0 or above.
  (The cable ties should be used to fasten the power wire and they are supplied with the unit.)

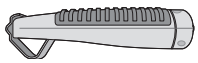


Tightening Torque (kgf • cm)		
M4	12.0~14.7	1 phase 220V
M8	56.1~74.4	3 phase 380V

CAUTION

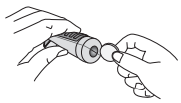
- When removing the outer sheath of the power supply cable, be careful not to scratch the inner sheath of the cable.
- Make sure that more than 20mm of the outer sheath of the indoor unit power supply cable and communication cable are inside the electrical component box.
- Install the communication cable separately from power cable and other communication cables.

Examples to use cable striper

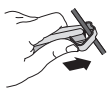


<Cable striper>

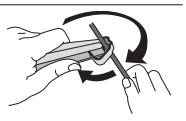
1. Adjust the blade position by coin(the controller is at the bottom side of the tool). Fix the blade position according to the outer sheath thickness of the power cable.



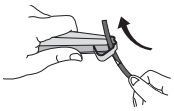
2. Fix the power cable and tool by using the hook at the top side of the tool.



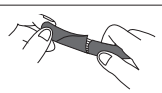
3. Cut out the outer sheath of the power cable by revolving the tool in the direction of the arrow, two or three times.



4. At this situation, cut out the outer sheath of the power cable by moving the tool toward the arrow direction expressed.

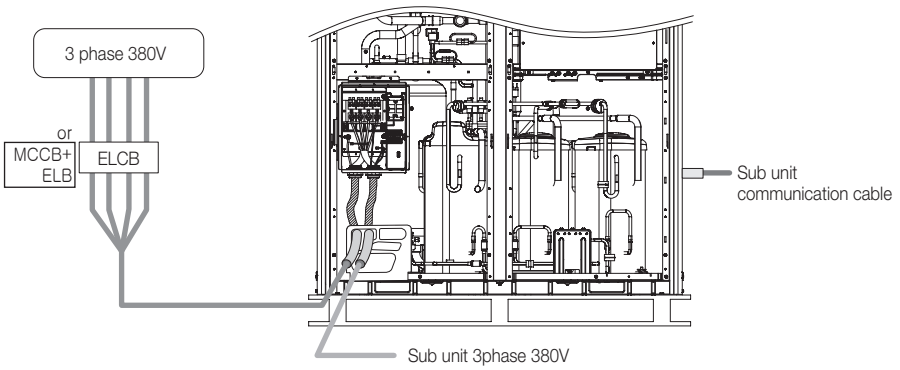


5. Slightly bend the wire and pull out the cut part of the outer sheath.



WIRING WORK

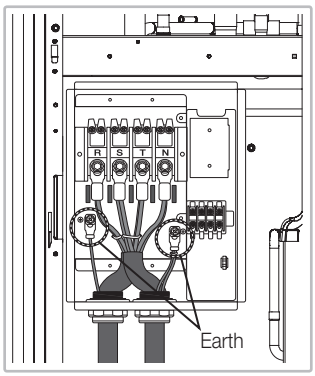
Power supply cable arrangement



CAUTION

- Do not let the power supply cable come into contact with the pipes inside the outdoor unit.
  If the power supply cable touches the pipes, the vibration of the compressor is transferred to the pipes and can damage the power supply cables or pipes, creating the danger of fire or explosion.
- Make sure that the place where the sheath of power supply cable is removed is inside the power supply box. If it is impossible, you should connect the protective tube of power supply cable to the power supply box.
- After positioning the power supply cable into the power supply box, tighten the cover.

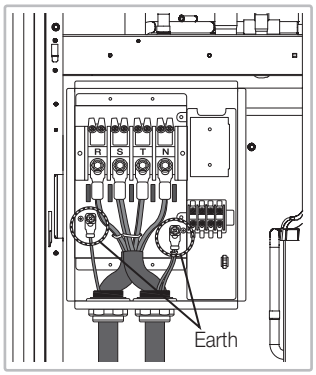
Connect the ring terminal of 3phase cable (CV)



1. Tailor the power cable according to its length and connect it with the solderless terminal.
2. After connecting the power cable to the terminal as seen in the picture, fix it with cable tie.
3. Fix the housing which has an insulator to the terminal board.

Ground cable arrangement

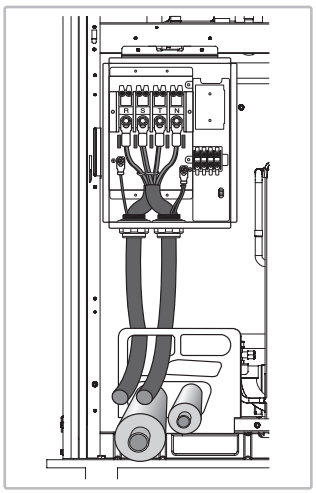
- Connect the ground wire to the grounding hole inside the power supply box.



Taking wires out of the outdoor unit

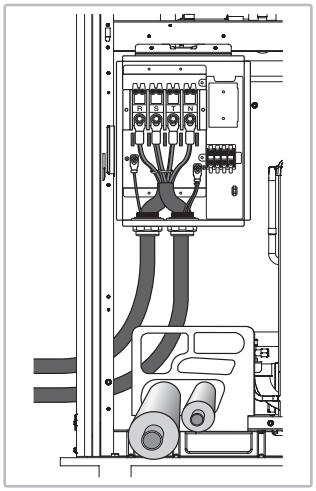
Power cable wiring to front side of unit

- Connect the cable protection tube into the power supply box as shown picture.
- Be sure that the power supply cable is not damaged by burr of knock-out hole.



Power cable wiring to side of unit

- Connect the cable protection tube to the power supply box after knock out the hole in the middle of side cabinet.
- When knocking out the hole, be careful to avoid damaging to pipes, sensors.
- Be sure that the power supply cable is not damaged by burr of knock-out hole.



WIRING WORK

Grounding work

- Grounding must be done by a qualified installer for your safety.

▶ Grounding the power cable

- The standard of grounding may vary according to the rated voltage and installation place of the air conditioner.
- Ground the power cable according to the following.

Power condition \ Installation place	High humidity	Average humidity	Low humidity
Voltage of lower than 150V		Perform the grounding work 3. Note 1)	Perform the grounding work 2 if possible for your safety. Note 2)
Voltage of higher than 150V		Must perform the grounding work 3. Note 1) (In case of installing circuit breaker)	

Note 1) Grounding work 3

- ◆ Grounding must be done by your installation specialist.
- ◆ Check if the grounding resistance is lower than 100Ω.
  When installing a circuit breaker that can cut the electric circuit in case of a short circuit, the allowable grounding resistance can be 30~500Ω.

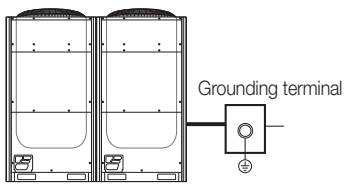
Note 2) Grounding at dry place

- ◆ The grounding resistance is should be lower than 100Ω.
  (It should not be higher than 250Ω)

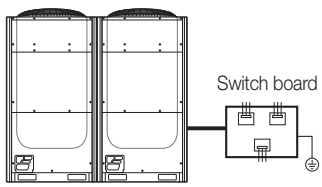
▶ Performing the grounding work

- Use the grounding wire by referring to the specification of the electric cable for the outdoor unit.

✳ When using the terminal for grounding only

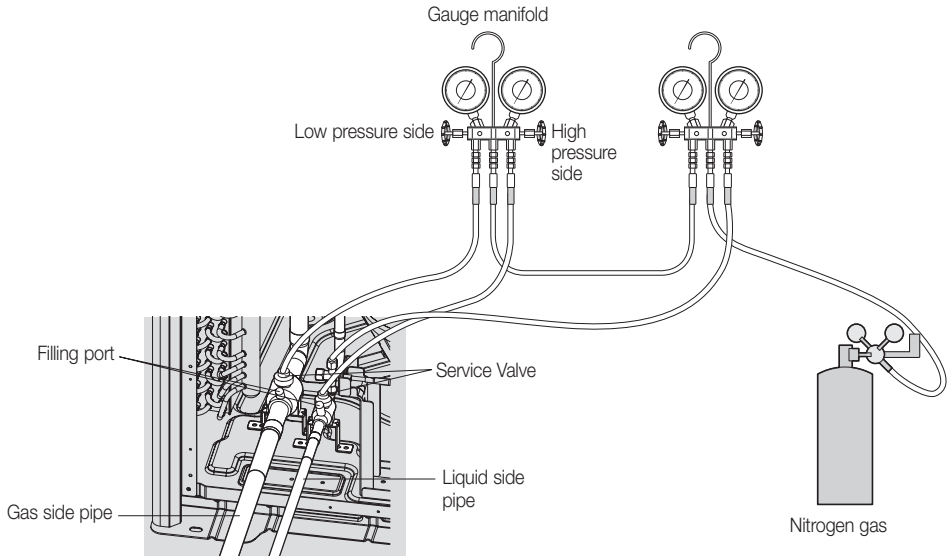


✳ When using grounding of the switch board



PERFORMING THE REFRIGERANT GAS LEAK TEST

- Use tools for R410A to prevent the inflow of foreign substances and resist against the internal pressure.
- Do not remove the core of filling port.
- Use dry Nitrogen gas as doing an airtight test like below.



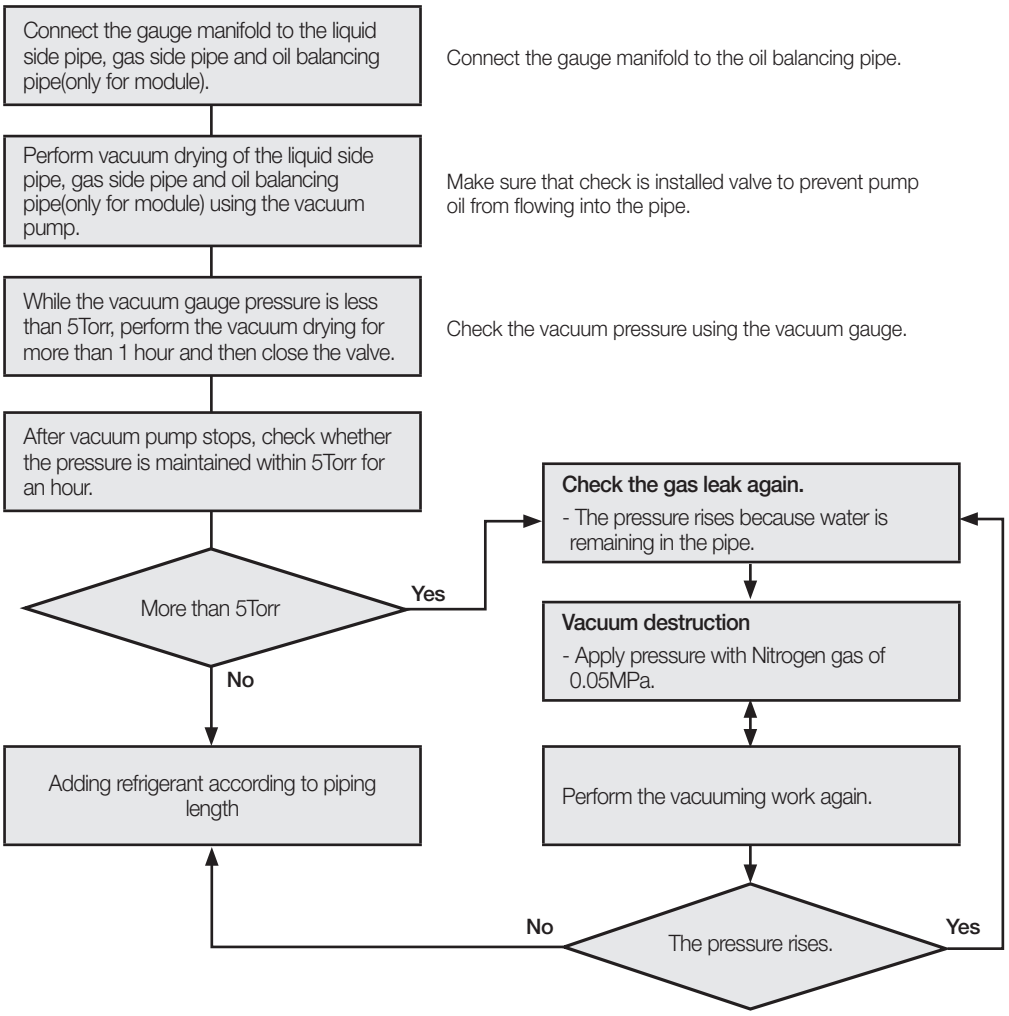
Apply pressure to the liquid side pipe, gas side pipe and oil balancing pipe(only for module) with Nitrogen gas of 4.1MPa.	If you apply pressure more than 4.1MPa, the pipes may be damaged. Apply pressure using pressure regulator.
Keep it for minimum 24 hours to check if the pressure drops.	After applying Nitrogen gas, check the change of pressure using pressure regulator.
If the pressure drops, check if there is gas leak.	If the pressure is changed, apply soapy water to check the leak. Check the pressure of the gas again.
Maintain 1.0MPa of the pressure before performing vacuum drying and check further gas leak.	After checking first gas leak, maintain 1.0MPa to check further gas leak.

CAUTION

- Perform a Nitrogen gas leak test the service valve of the outdoor unit closed.
- Charge with nitrogen gas across all three pipe connections.
- If the pipe is filled in a short time with a highly excessive pressure of Nitrogen gas, the pipes may be damaged. Make sure to use a regulator to prevent the high pressure Nitrogen gas over 4.1MPa into the pipe.

VACUUM DRYING

- Use the tools for R410A to prevent the inflow of foreign substances and resist against the internal pressure.
- Vacuum system to -100.7kPa.
- Use the vacuum pump with the check valve to prevent pump oil from flowing backward while the vacuum pump is stopped.
- Close the service valve of the liquid side pipe, gas side pipe and oil balancing pipe completely.



CAUTION

- If the pressure rises in an hour, water remains inside the pipe or there will be a leak.
- **Make sure to perform the airtight test and vacuuming for liquid pipe, gas pipe and high pressure gas pipe after Heat Recovery installation.**
  If not, a trouble is caused in the airtight test and vacuum due to obstruction of gas flow.
- When the ambient temperature of vacuuming pipe is low (less than 0°C), moisture might remain within the pipe. Therefore, pay special attention to the pipe seal in the winter.

INSULATING THE REFRIGERANT PIPE

Insulating the refrigerant

- You must check if there is a gas leak before completing all the installation process.
- Use EPDM insulation which meets the following condition.

Item	Unit	Standard
Density	g/cm^3	0.048~0.096
Dimension change route by heat	%	-5 or less
Water absorption rate	g/cm^3	0.005 or less
Thermal conductivity	kcal/m·h·℃	0.032 or less
Moisture transpiration factor	ng/(m^2·s·Pa)	15 or less
Moisture transpiration grade	g/(m^2·24h)	15 or less
Formaldehyde dispersion	mg/L	-
Oxygen rate	%	25 or less

Selecting the insulator of refrigerant pipe

- Insulate the gas pipe and liquid pipe by referring to the thickness of insulator for each pipe size.
- The standard condition is 30°C, less than humidity 85%. If the condition is in high humidity, use one grade thicker.

Pipe	Pipe size (mm)	Insulator(Cooling, Heating)		Remarks
		Standard [30°C, 85%]	High humidity [30 °C, 85% or more]	
		EPDM, NBR		
Liquid pipe	Ø6.35~Ø9.52	9t	←	Heat resisting temperature is more than 120°C
	Ø12.70~Ø50.80	13t	←	
Gas pipe	Ø6.35	13t	19t	
	Ø9.52~Ø25.40	19t	25t	
	Ø28.58~Ø44.45		32t	
	Ø50.80	25t	38t	

- When installing insulation in places and conditions below, use the same insulation that is used for high humidity conditions.

  <Geological condition>

  - High humidity places such as shoreline, hot spring, near lake or river, and ridge (when the part of the building is covered by earth and sand.)

  <Operation purpose condition>

  - Restaurant ceiling, sauna, swimming pool etc.

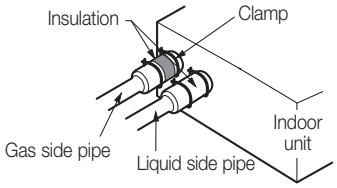
  <Building construction condition>

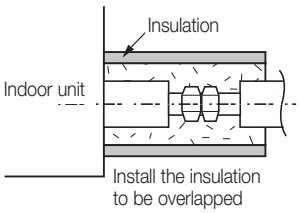
  - The ceiling frequently exposed to moisture and cooling is not covered.
    e.g. The pipe installed at a corridor of a dormitory and studio or near an exit that opens and closes frequently.
  - The place where the pipe is installed is highly humid due to the lack of ventilation system.

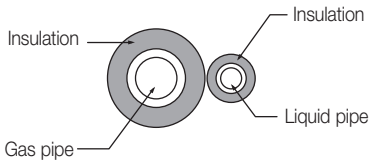
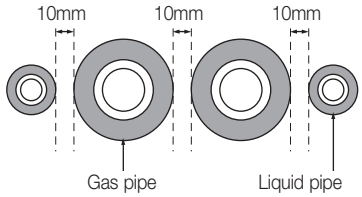
INSULATING THE REFRIGERANT PIPE

Insulating the refrigerant pipe

- Be sure to insulate the refrigerant pipe, joints and connections with class 'o' material.
- If you insulate the pipes, the condensed water does not fall from the pipes and the capacity of the air conditioner is improved.
- Check if there are any insulation cracks on the bent pipe.

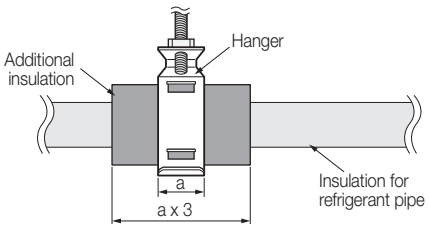




Pipe insulation	Pipe insulation after insulating EEV kit
• Insulation of the gas and liquid pipes can be in contact with each other but they should not be pressing each other. • When contacting the gas side and liquid side pipe, use thicker insulation.	• When installing the gas side and liquid side pipes, leave 10mm of space. • When contacting the gas side and liquid side pipe, use thicker insulation.
	

CAUTION

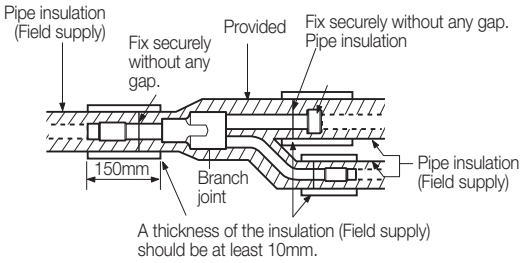
- Install the insulation not to be get wider and use the adhesives on the connection part of it to prevent moisture entering.
- Wind the refrigerant pipe with insulation tape if it is exposed to outside sunlight.
- Install the refrigerant pipe respecting that the insulation does not get thinner on the bent part or hanger of pipe.

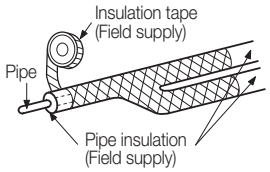


Insulating the branch joint

▶ Y-joint & liquid side of the outdoor unit

- Attach the insulation provided with a branch joint to the insulation purchased individually without a gap. Wrap the connected part with an insulation (purchased in the market) of a thickness of at least 10mm.
- Use an insulation that should be able to handle the interior temperature over 120°C. Wrap the branch joint with an insulation of a thickness of at least 10mm.

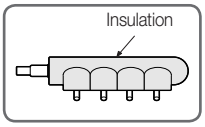


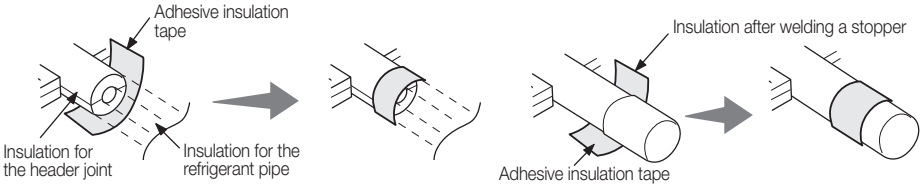


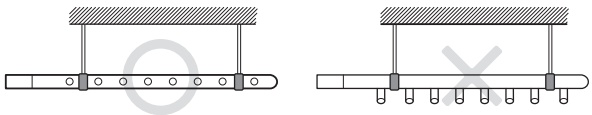
✻ Attach the adhesive insulation tape to the pipe as shown in the picture after insulating the pipe.

▶ Header joint

- Fasten the header joint using a cable tie and cover the connected part.
- Insulate the header joint and the welding part and wrap the connected part with an adhesive insulation tape to prevent it from defrosting.







✻ Fix the header joint after insulating it.

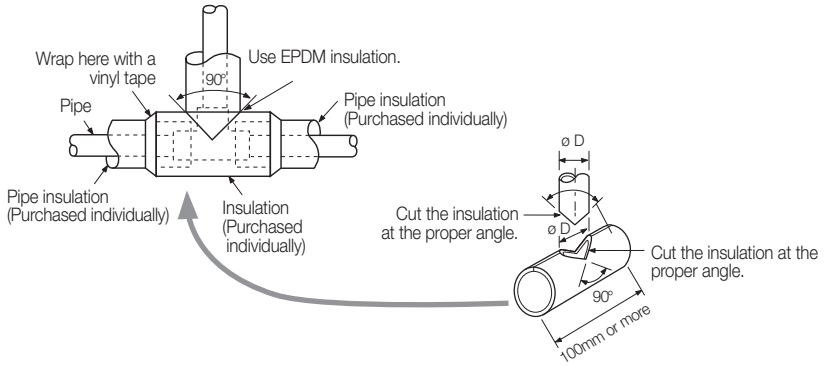
ENGLISH

INSULATING THE REFRIGERANT PIPE

Insulating the branch joint

▶ **Outdoor joint & gas side of the outdoor unit**

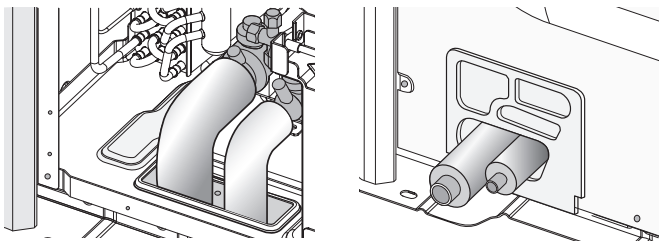
- Use an insulation that should be able to handle the interior temperature over 120°C.
- Wrap the branch joint with an insulation of a thickness of at least 10mm as shown in the picture.
- Wrap the connected part between the Outdoor joint and the gas side of the outdoor unit to prevent it from defrosting.



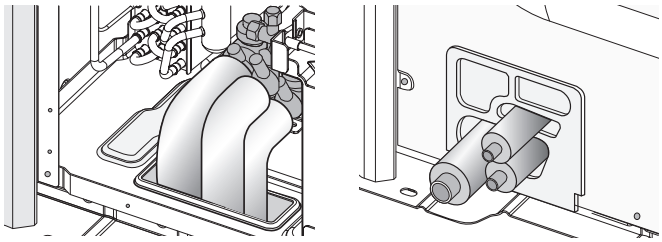
▶ **Insulating the interior of the outdoor unit pipe**

- Insulate the whole service valve of the outdoor unit with a pipe insulation.
- Seal the gap between the outdoor unit pipe and the insulation.
  Rainwater and dewdrops may soak through the gap between the pipe and the insulation of the outdoor unit installed on the outside.
- Separate the cover of the pipe and close it after insulation work.
  Remove a knock-out hole cover that installed the pipe and use it.
  If the extra knock-out hole is open, small animals such as squirrels and rats may get into the unit through the hole and the unit may be damaged.

DVM PLUS IV



DVM PLUS IV HR



completing the installation and commissioning

CHARGING REFRIGERANT

- The R410A refrigerant is blended refrigerant. Add only liquid refrigerant.
- Measure the quantity of the refrigerant according to the length of the liquid side pipe. Add quantity of the refrigerant using a scale.

Important information regulation regarding the refrigerant used

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

CAUTION

Inform user if system contains 3kg or more of fluorinated greenhouse gases. In this case, it has to be checked for leakage at least once every 12 months, according to regulation n°842/2006. This activity has to be covered by qualified personnel only.

In case situation above (3kg or more of R410A), installer (or recognized person which has responsibility for final check) has to provide a maintenance book, with all the information recorded according to REGULATION (EC) N° 842/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on certain fluorinated greenhouse gases.

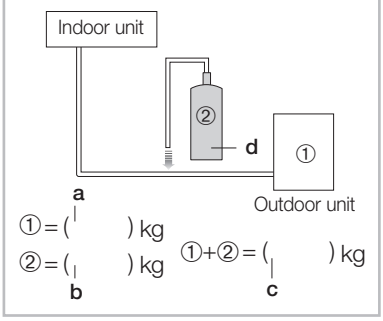
Please fill in with indelible ink,

- ① the factory refrigerant charge of the product.
- ② the additional refrigerant amount charged in the field.
- ①+② the total refrigerant charge.
  The refrigerant charge label supplied with the product.

Refrigerant type	GWP value
R410A	1975

❉ GWP=Global Warming Potential

Contains fluorinated greenhouse gases covered by the Kyoto Protocol.



Note

a. Factory refrigerant charge of the product: see unit name plate.
b. Additional refrigerant amount charged in the field. (Refer to the above information for the quantity of refrigerant replenishment.)
c. Total refrigerant charge.
d. Refrigerant cylinder and manifold for charging.

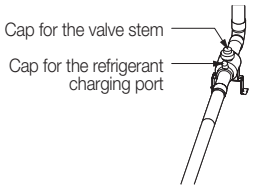
CAUTION

The filled-out label must be adhered in the proximity of the product charging port. (ex. onto the inside of the stop valve cover.)

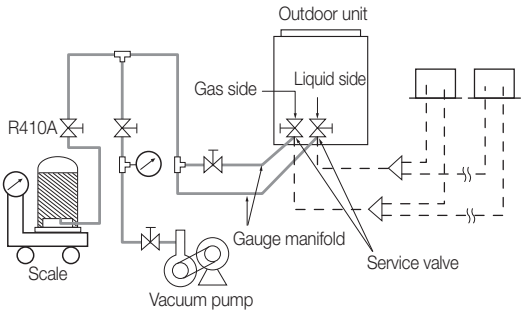
completing the installation and commissioning

Service valve work for gas pipe

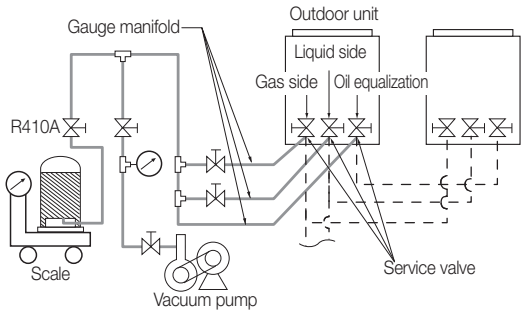
- Block the cap of the service valve after charging the refrigerant.
  - Connection torque of the cap for the refrigerant charging port : 6.0N·m
  - Connection torque of the stem : 25N·m.
  - Adjustable torque of the valve stem.
    ø19.05~ : 10.0N·m



When installing 1 outdoor unit



When installing more than 1 outdoor unit



- Open the gauge manifold valve connected to the liquid side service valve and add the liquid refrigerant.
- If you cannot add the whole quantity of the refrigerant while the outdoor unit is stopped, open the gas side and liquid side service valve. Add remaining refrigerant by pressing the refrigerant adding button of the outdoor PCB.

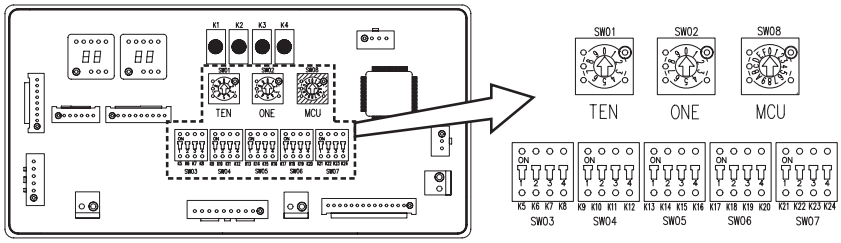
CAUTION

- Open the gas side and liquid side service valve completely after charging the refrigerant. (If you operate the air conditioner with the service valve closed, the important parts may be damaged.)
- When using the modular outdoor unit, open the service valve of the oil balancing pipe.
- Put on safety equipment when charging refrigerant.
- When the refrigerant is being charged, do not perform any other work such as insulation, dip switch setting etc.
- Make sure not to get damaged from the fan when operating the unit while the front panel is being opened.
- Do not heat the refrigerant vessel for fast refrigerant charging when the outside temperature is low during winter season. There is a potential risk of explosion.
- Make sure that the refrigerant does not emit while connecting the gauge manifold to the charging port for heating.
- Close the valve of the refrigerant vessel rapidly after charging refrigerant. If not, a change in the whole refrigerant quantity may occur.

completing the installation and commissioning

SETTING THE OPTION SWITCHES & FUNCTION KEYS

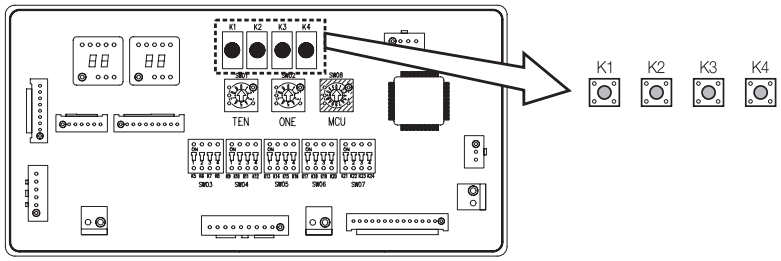
Option switch of the outdoor unit



Switch	Setting		Function	Remarks
SW01/ SW02			Setting the total number of indoor unit installation SW01 : The tens digit, SW02 : The units digit	Setting is available only with the main outdoor unit(sub unit : setting is unnecessary) Ex) When the 12 indoor units are installed : [SW01:1, SW02: 2]
SW03	K5	ON	Manual ADDRESS setting	Factory default
		OFF	Auto ADDRESS setting	
SW04	K9	K10	Target evaporating temperature(°C)	
	ON	ON	7~9	Cooling capacity adjustment
	ON	OFF	5~7	
	OFF	ON	9~11	
	OFF	OFF	10~12	
	K11	K12	Target high pressure (kg/cm²)	
	ON	ON	No high pressure target value adjustment	Heating capacity adjustment
	ON	OFF	31.5 kg/cm²	
	OFF	ON	25.0 kg/cm²	
	OFF	OFF	27.0 kg/cm²	
SW05	K13	K14	Selecting the outdoor units address	
	ON	ON	Outdoor unit's address : No 1	Main unit, Factory default
	ON	OFF	Outdoor unit's address : No 2	Sub unit 1
	OFF	ON	Outdoor unit's address : No 3	Sub unit 2
	OFF	OFF	Outdoor unit's address : No 4	Sub unit 3
	K15	K16	Current limit function	
	ON	ON	Use standard value of current limit	Factory default
	ON	OFF	Apply standard value of current limit x 90%	
	OFF	ON	Apply standard value of current limit x 80%	
	OFF	OFF	Non use of the standard value of current limit	
SW06	K17	ON	Standard value (5 hours interval after turning on the outdoor unit, and then 7 hours interval.)	Oil collecting interval
		OFF	2 hours interval after turning on the outdoor unit and then 2 hour interval.	
	K18	ON	Defrosting temperature integer (α) = MID, Not using the function to remove snowdrift on the top.	Standard value of defrosting start time
		OFF	Defrosting temperature integer (α) = LOW2, Using the function to remove snowdrift on the top.	Reduce the defrosting start time
	K19	ON	Standard value	-
		OFF	Fan step compensation (Maximum step)	Maximum fan step compensation
	K20	ON	Standard value	Select night's quiet mode
		OFF	Use night quiet mode	
SW07	K21	ON	Use anti-dew function mode (in cooling operation)	Select anti-dew function mode
		OFF	Non use anti-dew function mode (in cooling operation)	
	K22	ON	-	-
		OFF	-	
	K23	ON	-	-
		OFF	-	
	K24	ON	-	-
		OFF	-	
SW08		-	Setting total number of MCU installation	Setting is available only with the main outdoor unit (sub unit : setting is unnecessary) When the 12MCU are installed : [SW08:C] ❉ Applicable to HR model only

✳ Factory default setting
SW01/02, SW08 : 0
SW03~07 : On

Key function



K1 (Push time)	KEY operation	7-Segment Display
1	Heating refrigerant charging	"K" "1" "BLANK" "BLANK"
2	Heating trial operation	"K" "2" "BLANK" "BLANK"
3	Heating Pump Out (Outdoor unit address 1)	"K" "3" "BLANK" "1"
4	Heating Pump Out (Outdoor unit address 2)	"K" "3" "BLANK" "2"
5	Heating Pump Out (Outdoor unit address 3)	"K" "3" "BLANK" "3"
6	Heating Pump Out (Outdoor unit address 4)	"K" "3" "BLANK" "4"
7	Vacuum mode (Outdoor unit address 1)	"K" "4" "BLANK" "1"
8	Vacuum mode (Outdoor unit address 2)	"K" "4" "BLANK" "2"
9	Vacuum mode (Outdoor unit address 3)	"K" "4" "BLANK" "3"
10	Vacuum mode (Outdoor unit address 4)	"K" "4" "BLANK" "4"
11	Vacuum mode (All outdoor units)	"K" "4" "BLANK" "A"
12	End KEY operation	-

K2 (Push time)	KEY operation	7-Segment Display
1	Cooling refrigerant charging	"K" "5" "BLANK" "BLANK"
2	Cooling trial operation	"K" "6" "BLANK" "BLANK"
3	Cooling Pump Down (All outdoor units)	"K" "7" "BLANK" "BLANK"
4	Pipe checking	"K" "8" "BLANK" "BLANK"
5	Checking the amount of refrigerant	"K" "9" "BLANK" "BLANK"
6	End KEY operation	

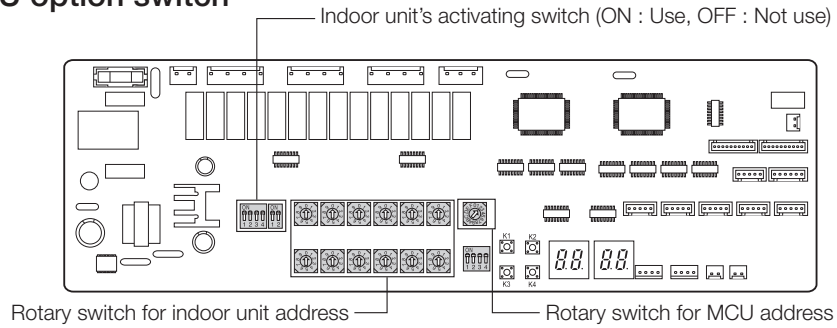
K3 (Push time)	KEY operation	7-Segment Display
1	Initializing(Reset)operation	The same as initializing operation

K4 (Push time)	KEY operation	Display	
		SEG 1	SEG 2, 3, 4
1	Outdoor capacity	1	Ex) 16 HP → Off, 1, 6
2	Digital COMP Loading Time	2	Ex) Loading 13 sec → Off, 1, 3
3	High pressure (kg/cm²)	3	Ex) High pressure 15.2 (kg/cm²) → 1, 5, 2
4	Low pressure (kg/cm²)	4	Ex) Low pressure 4.3 (kg/cm²) → 0, 4, 3
5	Discharge temperature COMP1	5	Ex) 87℃ → 0, 8, 7
6	Discharge temperature COMP2	6	Ex) 87℃ → 0, 8, 7
7	Discharge temperature COMP3	7	Ex) 87℃ → 0, 8, 7
8	CT sensor value COMP 1	8	Ex) 2A → 0, 2, 0
9	CT sensor value COMP 2	9	Ex) 2A → 0, 2, 0
10	CT sensor value COMP 3	A	Ex) 2A → 0, 2, 0
11	Suction 1 temperature	B	Ex) -5 ℃ → -, 0, 5
12	Cond Out temperature	C	Ex) 35℃ → 0, 3, 5
13	Liquid pipe temperature	C	Ex) 35℃ → 0, 3, 5
14	Oil temperature	C	Ex) 35℃ → 0, 3, 5
15	Sump temperature COMP 1	F	Ex) 35℃ → 0, 3, 5
16	Outdoor temperature	G	Ex) 35℃ → 0, 3, 5
17	EVI inlet temperature	H	Ex) 35℃ → 0, 3, 5
18	EVI outlet temperature	I	Ex) 35℃ → 0, 3, 5
19	Main EEV 1 step	J	Ex) 2000 steps → 2, 0, 0
20	Main EEV 2 step	K	Ex) 2000 steps → 2, 0, 0
21	EVI EEV step	L	Ex) 300 steps → 3, 0, 0
22	HR EEV step	M	Ex) 300 steps → 3, 0, 0
23	Fan step (SSR or BLDC)	N	Ex) 13 steps → 0, 1, 3
24	Sump temperature COMP 2	O	-42℃ → -, 4, 2
25	Sump temperature COMP 3	P	-42℃ → -, 4, 2
26	Result of checking the amount of refrigerant	Q	NUL: no result NG: Failure 80%: or less 120 or more%: 80~120: Display number
27	Suction2 temperature	R	Ex) 87℃ → 0, 8, 7
28	S/W version	S	Month, day (ex: 2010. 11. 20 → 0B20)

completing the installation and commissioning

SETTING THE OPTION SWITCHES & FUNCTION KEYS

MCU option switch



How to set up

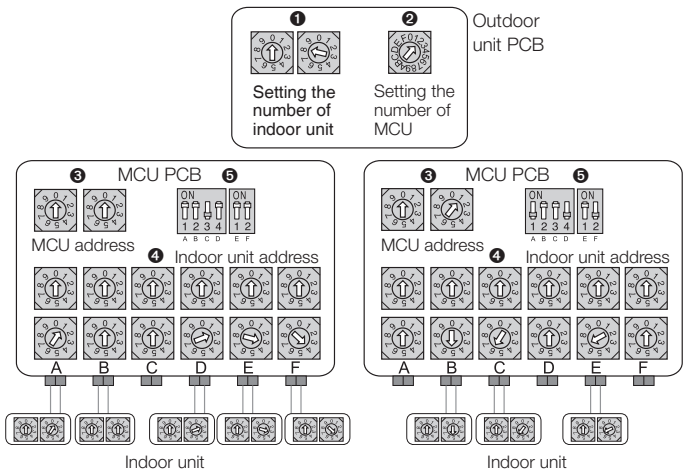
❶ Set the rotary switch located at outdoor unit PCB to match the number of connected indoor units (8).

❷ Set the rotary switch located at outdoor unit PCB to match the number of connected MCU (2).

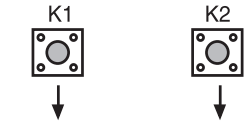
❸ When installing more than 2 MCUs, set each rotary switch of MCU differently.

❹ Set rotary switch located at MCU PCB to match indoor unit address.

❺ Set the DIP switch of MCU to "OFF" position for the indoor units that is not connected.



Key operation



K1 (Pushed time)	Display Contents	Display segment				Remarks
		1	2	3	4	
1	MCU address	1	Blank	0	0	MCU address 0
			Blank	0	1	MCU address 1
			Blank	0	2	MCU address 2
			Blank	1	1	MCU address 11
			Blank	1	5	MCU address 15
2	MCU EEV step	2	1	4	0	Ex) 1400 steps → 140 (Actual steps/10)
3	Subcooler-in EEV step	3	4	8	0	Ex) 480 steps
4	Subcooler-in sensor temperature	4	-	0	1	Ex) -1°C
			Blank	1	0	Ex) 10°C
5	Subcooler-out sensor temperature	5	-	0	1	Ex) -1°C
			Blank	1	0	Ex) 10°C

K1 (Pushed time)	Display Contents	Display segment				Remarks
		1	2	3	4	
6	On/Off for solenoid valve A_C, A_H	A	-	• ✶_C : Cooling solenid valve of port ✶ • ✶_H : Heating solenid valve of port ✶ • 3rd segment : Cooling solenid valve On : 1 / Off : 0 • 4th segment : Heating solenid valve On : 1 / Off : 0		
7	On/Off for solenoid valve B_C, B_H	B				
8	On/Off for solenoid valve C_C, C_H	C				
9	On/Off for solenoid valve D_C, D_H	D				
10	On/Off for solenoid valve E_C, E_H	E				
11	On/Off for solenoid valve F_C, F_H	F				
12	On/Off for liquid by pass solenoid valve	G	Blank	0	N	On
13	On/Off for main heating solenoid valve	H	0	F	F	Off
14	Version	8	A	2	0	Ex) October 20, 2008 ➞ 8A 20 • 1st segment : Year (ex: 2008 ➞ 8) • 2nd segment : Month (1~C) • 3rd, 4th segment : Day
15	End of K1 display					

Display contents		Display
Cooling solenid valve of port B Heating solenid valve of port B	On Off	-10
Cooling solenid valve of port B Heating solenid valve of port B	On Off	-01

K2 (Pushed time)	Display Contents	Display segment				Remarks
		1	2	3	4	
1	Indoor unit main address for matching with port A	A	-	0	0	Indoor unit main address of port A : 0
2	Indoor unit main address for matching with port B	B	-	0	3	Indoor unit main address of port B : 3
3	Indoor unit main address for matching with port C	C	-	0	6	Indoor unit main address of port C : 6
4	Indoor unit main address for matching with port D	D	-	0	9	Indoor unit main address of port D : 9
5	Indoor unit main address for matching with port E	E	-	1	1	Indoor unit main address of port E : 11
6	Indoor unit main address for matching with port F	F	-	1	5	Indoor unit main address of port F : 15
7	End of K2 display					

COMPLETING THE INSTALLATION

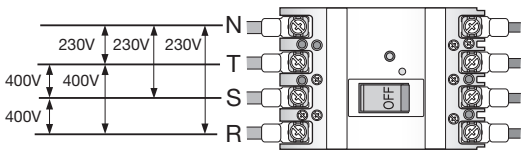
- Measure the power cable terminal (3-phase: R, S, T, N and 1 phase: L, N) and the grounding of the outdoor unit using a DC 500V ohm meter before connecting the power.
  - The measured value should be over 30MΩ.

CAUTION
- Never measure the communication terminal to prevent the communication circuit from being damaged.
- Check the short-circuit of the communication terminal using the circuit test system.

- Check the terminal voltage and the phase using a voltmeter and phase test system before connecting the power.

  - R, S, T, N terminal : 400V between wires (R-S, S-T, T-R)
    230V between phases (R-N, S-N, T-N)

- Turn the switch on after checking the terminal.



<ELB>

- Check the R410A indoor unit is connected.
- **If the power cables, R,S and T, are cross wired, E425 error occurs. Check for proper connection of the power cable.**
- **Protection system cuts power of the PCB for overvoltage when N phase is cross wired to the R,S,and T. Check the power connection from N phase if the PCB is not turned on.**

completing the installation and commissioning

COMPLETING THE INSTALLATION

- Check the following after the installation is completed.

Installation	**Outdoor unit**	• Check the external surface and the inside of the outdoor unit. • Is there any possibility of short circuit? • Is the place well-ventilated and ensures space for service? • Is the outdoor unit fixed securely?
	Indoor unit	• Check the external surface and the inside of the indoor unit. • Is the place well-ventilated and ensures space for service? • Check if the center of the indoor unit is ensured and it is installed horizontally.
Refrigerant pipe work		• Is total number of connecting indoor units in the allowable range? • Are the length and the difference between the refrigerant pipes within the allowable range? • Is the Y-joint properly installed? • Is the pipe properly insulated? • Is the quantity of the additional refrigerant correctly weighed in?
Installing the drain pipe		• Check the drain pipe of the outdoor unit and the indoor unit. • Have you completed the drain test? • Is the drain pipe properly insulated?
Installing the wiring		• Have you performed the earthing work 3 to the outdoor unit? • Is 2-core cable used? • Is the length of the wire is in the limited range? • Is the wiring route correct?
Setting ADDRESS		• Are the ADDRESSES of the indoor and outdoor units properly set? • Is the switch setting of the indoor units for centralized control properly made?

FINAL CHECKS AND TRIAL OPERATION

Inspection before trial operation

1. Check the power cable and communication cable of the indoor and outdoor unit.

2. Turn the circuit breaker(3 phases and 1 phase) on 4 hours before initial operation so that the crank case heater can be heated.

3. Check the power supply between the outdoor unit and the cabinet panel.
- Check the 3 phase power of the compressor {L1(Red), L2(White), L3(Black)} by the 3 phase tester.
- Check the 220V power with the voltage meter.

4. Once the outdoor unit is turned on, it performs the tracking to check the connected indoor unit and options.

5. Write down the details about the installation on the card attached on the front side of the control box.

CAUTION
- Turn the circuit breaker on 4 hours before initial operation so the crank case heater can be heated enough to start the system.
- If the heater is not heated, the air conditioner does not operate for 2 hours and 30 minutes to protect the compressor.
('CH' is displayed on the PCB display of the outdoor unit)

Trial operation

1. Run the unit by KEY MODE or controller.

- 1st- Operate all indoor units by KEY MODE located outdoor PCB.
  2nd- Operate each indoor unit run separately by controller.
- Inspect the compressor sound during the initial operation.
  If roaring sound is heard, stop operation.
- If roaring sound is heard and the pressure does not change, the back-lashing of the compressor may occur.
  Check the power supply of the compressor. If the problem occurs continuously, check the compressor power cable.
  3 phase: T1(L1)(R)-Red, T2(L2)(S)-White, T3(L3)(T)-Black

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2. Check the indoor and outdoor units' running status.

- Check indoor unit cooling and heating air flow
- Each indoor unit controls: air flow direction, air velocity
- Indoor and outdoor unit's abnormal running noise
- Proper drainage from indoor unit in cooling mode
- Check detail running status using S-NET program.

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3. If error occurs during trial operation, check the error code of the unit and follow the instruction.

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4. Explain to the customer how to use the air conditioner according to the user's manual.

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5. Give the installation manual to the user.

CAUTION Make sure top and bottom cabinets of the outdoor unit are closed before operating. The unit may not work properly and fail to get S-NET data if the cabinets are open.